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ABSTRACT

This educational manual, an interdisciplinary effort of professionals throughout South Dakota, is intended to serve as a practical guidebook of ideas to better serve the nutritional needs of the developmentally disabled population. The manual addresses: dietary aids for specific disorders; appropriate foods or supplements for optimal nutrition; techniques to facilitate feeding and swallowing; and instructional materials suitable for food service personnel, parents, and health professionals. Sections address such topics as: nutrition for developmentally disabled children; nutritional status of the handicapped child; vitamins; fluids and minerals; nutritional care of slow-growing and underweight children; management of the overweight person; recommendations for persons needing diets for special medical conditions; management of low or excessive appetite; refusal to eat certain foods; unusual feeding problems; gagging, vomiting, and rumination; acute and chronic bowel problems; abnormal motor patterns affecting feeding, chewing and swallowing; management of inability to self feed; oral-dental health for the developmentally disabled; the impact of drugs on nutrition; and resources. Many guides are included in these sections, detailing such information as food intake patterns for optimal nutrition, height and weight charts, nutrition assessment checklists, and suggestions for improving nutrient intake. (CB)

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Nutrition and Feeding for the Developmentally Disabled

"A How-To Manual"

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This project was funded through a Nutrition Education Training Grant awarded to the South Dakota University Affiliated Faculty (SDUAF) Center for the Developmentally Disabled (CDD) University of South Dakota School of Medicine from the South Dakota Department of Education & Cultural Affairs - Child Adult Nutrition Services.

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December 6, 1985

Mr. Gary Engel
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Dear Mr. Engel:

The Council of the South Dakota State Medical Association met on November 22, and received a report on the "Nutrition and Feeding for Developmentally Disabled" manual which was funded through a grant from the South Dakota Department of Education. The Council took the following action:

> "Moved that the Council of the State Medical Association support the publication of the "Nutrition and Feeding for Developmentally Disabled" manual. The motion was seconded and carried."

This is sent to you for your information and files.

Sincerely yours,

Jan Anderson

(Mrs.) Jan Anderson
Assistant Executive Secretary

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FOREWORD

This Nutrition and Feeding Manual for the Developmentally Disabled is an interdisciplinary effort of professionals throughout the State of South Dakota. The project was made possible through a Nutrition Education Training Grant from the South Dakota Department of Education, Division of Child and Adult Nutrition Services. It is hoped that this manual will serve as a reference for basic nutrition information and as a practical guidebook of ideas to better serve the nutritional needs of the developmentally disabled (DD) population.

Public Law 94-142, the Education for the Handicapped Children Act, states that all public schools will provide education in the least restrictive setting and an interdisciplinary evaluation for all handicapped (developmentally disabled) children. In South Dakota this includes all children from birth to 21 years. In fulfilling this legislative mandate, schools, including Area Adjustment Training Centers and vocational schools for the adult DD, should serve attractive and nutritious meals for all persons. It is the intent of the contributors to this manual to provide school food service staff, teachers, parents, and medical professionals with a "how to" manual that will assist them with their work in meeting the nutritional needs of the DD. The focus of this manual is the interdisciplinary approach used to meet the multiple nutrition and feeding needs of the DD person. Within the school system, school lunch personnel, special education teachers, school nurses, physicians, registered dietitians, physical, speech, and occupational therapists, and psychologists can all work together to meet the specific nutritional needs of the DD.

Because the nutritional needs of the DD vary and the skills required to meet those nutritional needs are also different, it is important that the school food service personnel, teachers, parents, and health care providers are aware of those diverse and unique needs of the handicapped individual. In that awareness, they are then able to meet those needs in a satisfying and pleasurable way for the handicapped person. It should never be forgotten that the pleasure of eating is human and should be enjoyed by all persons regardless of their physical or mental condition.

Disabling conditions can affect a person's ability to consume food. This can seriously affect the nutritional status. Effects can be of a mechanical nature (chewing and swallowing) or of a physiological nature (malabsorption, poor enzymatic activity, etc.).

The role of nutrition for the DD can be both preventive and restorative. The DD person may be more prone to malnutrition because of many factors (e.g., mechanical or physiological compounded with psychological stress of the handicapping condition). Thus the need for the team approach of qualified professionals in the work with the nutrition problems of the DD cannot be overemphasized.

Malnutrition for the DD person can compound alterations in growth, structural and functional development of the central nervous and neurohumoral systems, behavior, and resistance to stress and disease. The manual will address some of the specific nutritional problems of the DD person such as cerebral palsy, epilepsy and autism, as well as overlapping dietary problems that may affect learning and behavioral problems.

The hands-on approach of this educational manual will address the following areas:

1. dietary aids for specific disorders
2. appropriate foods or supplements for optimal nutrition
3. techniques to facilitate feeding and swallowing
4. instructional materials suitable for food service personnel, parents, and health professionals.

The objectives of the manual are

1. to provide educational and practical advice to parents, caregivers and health professionals. This may be accomplished in part by copying the appropriate guides, printed separately at the end of each chapter;
2. to provide food service personnel, parents, and health care professionals with special dietary information for the developmentally disabled;
3. to integrate nutrition and dietary information regarding the developmentally disabled into a single source which is available for all service providers to the developmentally disabled;
4. to provide a tool for instruction and large scale distribution of nutrition and dietary information to all South Dakotans who have involvement with the developmentally disabled;
5. to provide an on-going resource for those who work with meeting the nutritional needs of the developmentally disabled.

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NOTE: Not all self-identified dietitians or nutritionists may have a degree in nutrition. Refer to the glossary of terms in the back of this manual for a definition of a registered dietitian and a qualified nutritionist. For the purposes of this manual, a registered dietitian and qualified nutritionist will be used interchangeably.

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Definition of Developmental Disability

According to the Developmental Disabilities Assistance and Bill of Rights, S.3378, a developmental disability is

1. attributable to mental retardation or cerebral palsy or epilepsy or autism or learning disability; or
2. attributable to any other condition of an individual found to be closely related to mental retardation as it refers to general functioning or impairment in adaptive behavior or to require treatment similar to that required for mentally retarded individuals.

Civil Rights Responsibility

The National School Lunch Program benefits are made available and provided to all eligible individuals without discrimination on the basis of their race, color, national origin, sex, age, or handicapping condition.

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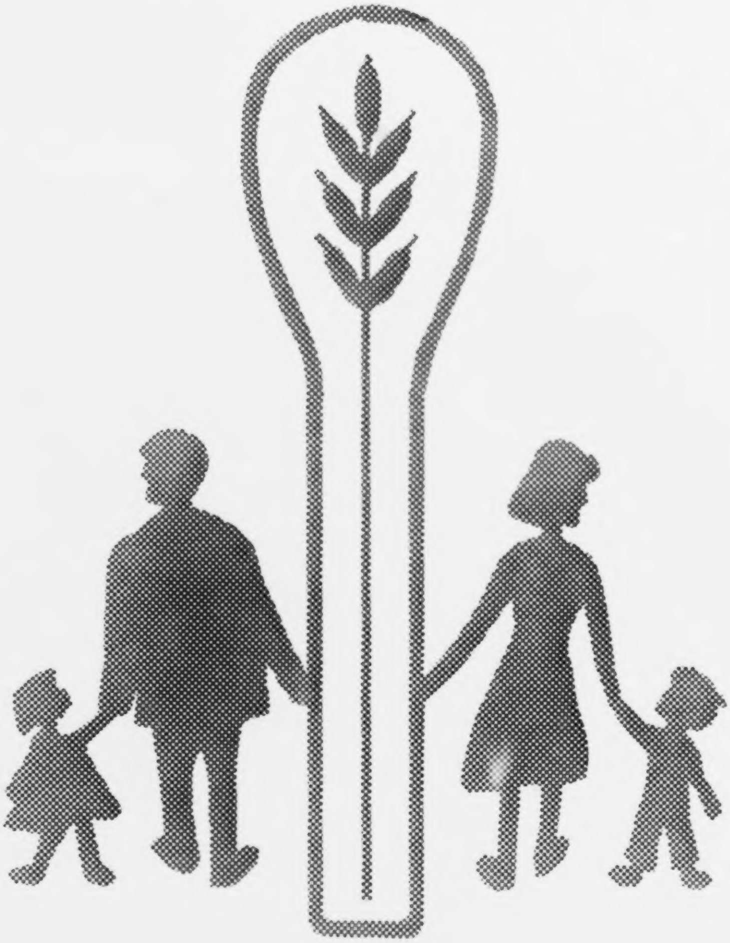

Introduction to Nutrition for Developmentally Disabled Children

1

NUTRITION FOR DEVELOPMENTALLY DISABLED CHILDREN

Why Be Concerned About Nutritional Requirements?

Of all the factors in a child's environment contributing to growth and functioning, nutrition is perhaps the most significant. Adequate nutrition is essential for the growth and health of a developmentally disabled child, just as it is for the growth and health of a normal child. Children with disabilities, however, have additional health problems with greater frequency than other children and therefore, different nutritional needs.

Disabling conditions can affect a person's ability to eat, which in turn, can seriously jeopardize health and growth. Abnormalities in growth and development that may result in feeding problems can be of a mechanical nature (sucking, chewing, swallowing) or of a physiological nature (malabsorption, inborn error of metabolism, allergy).

The role of nutrition for the developmentally disabled can be both preventive and restorative. It has been shown that developmentally disabled children are particularly susceptible to malnutrition, e.g., low intake of nutrients, short stature, anemia, or underweight. Malnutrition in a child can affect behavior, learning, and resistance to stress and disease. However, on a more positive note, adequate early nutritional intervention can prevent or minimize the extent of the damages due to undernutrition.

Basics Of Nutrition

Proteins, carbohydrates, and fats supply energy to the body for physical activity and maintenance of all essential body processes necessary to support life. Energy is measured in terms of Calories (Cal) or kilocalories (kcal). Proteins and carbohydrates both give four kcal per gram of weight. Fats, a more concentrated source of energy, give nine kcal per gram, more than twice as much. Any excess energy in the body, whether derived from dietary protein, carbohydrates, or fat, is stored as fat within the body.

Careful monitoring of protein intake is essential with developmentally disabled children, particularly slow eaters, and those exhibiting poor growth patterns or failure to thrive. Even when appropriate amounts of protein have been offered at meal time, feeding difficulties increase the risk of inadequate nutrient intake. Protein-calorie malnutrition (PCM, also referred to as PEM, protein-energy malnutrition) can result in physical and mental growth retardation. This can be prevented with early establishment of feeding habits and monitoring of nutritional intake of the child. It is generally recommended that approximately 15-20% of the total daily calories should come from protein.

Carbohydrates are the primary source of energy for all persons. The type of carbohydrate is important. At least 50% of the days calories should come from carbohydrates. Foods with high concentrations of the carbohydrate sucrose, especially the sticky and chewy types, such as caramels, suckers, and fruit roll-up candy should be avoided. Alternatives should be sought for these sugar-rich foods in school activities such as behavior reinforcement, birthday and holiday parties, and daily snacks, as well as for lunches and vended foods. Some suggestions include fresh fruit, popcorn with raisins or cheese, cheese and crackers, peanut butter sandwiches, peanut butter with celery or bananas, and fruit-filled rolls made with bread dough, and donuts without added sugar. Parents should also avoid giving high sugar foods as a reward or "everyday treat." Crunchy fruits and vegetables which have a cleansing action would be a better choice for snacks. Starch food items, and carbohydrates, such as whole wheat bread, crackers, and cereal make excellent snacks along with protein foods such as cheese and peanut butter. Carbohydrates contribute important fiber to the diet. Fresh fruits and vegetables are generally lower in calories and have a higher fiber content. This may help to reduce the incidence of constipation, a problem frequently encountered with developmentally disabled persons.

Fats are an important component of the diet, but because of their high calorie content, special attention should be given to the proportion of energy supplied by fat. As a general rule, fats and fatty foods should be limited to between 30-35% of the total caloric intake. Fats also increase the palatability and satiety (the feeling of fullness) in the diet. For the developmentally disabled child, fat is an important source of calories in the diet, especially when underweight.

General Guidelines For Meal Planning

Variety in foods consumed is the key to proper nutrition because no single food provides all the known nutrients. An adequate diet provides a balance of nutrients necessary for the body to promote health and to provide an environment for building and restoring body components. Foods may be combined in unlimited ways. It is important that by the end of the day or week all nutrient needs are met without an excess of calories. This principle applies whether the person is eating three meals a day, or five, and food is of value only if it is eaten.

The Recommended Dietary Allowances (RDA) formulated by the Food and Nutrition Board of the National Research Council, National Academy of Sciences, were designed to provide standards of nutrient intake for healthy populations. The RDA are revised periodically. There are no specific RDA for developmentally disabling conditions, but the RDA do provide a base for calculations.

A Daily Food Guide was developed by the U.S. Department of Agriculture (see Guide 1-1) to translate the technical language of nutrients into groups of food that could be used in planning diets. The foods are grouped according to the key nutrients they contribute. It is assumed that intakes of foods containing these nutrients will automatically provide the rest of the other nutrients. This guide can be modified to provide for individual variations in age, sex, medical condition or physical activity.

Once a basic diet plan is established using the Daily Food Guide, individual diet modifications for developmentally disabled children must be considered. The following questions can be used as a planning checklist:

1. Can the child eat by mouth?
2. Is tube feeding (nasogastric, gastrostomy, parenteral) more appropriate, or perhaps a combination would promote optimal development?

3. What is the most advanced food consistency tolerated: liquids (clear or full) or mechanical soft (chopped, mashed, ground, blended)?
4. Are there specific food restrictions such as a wheat-free or milk-free diet?
5. Are nutrient or caloric interventions prescribed such as a ketogenic diet (high fat, low carbohydrate); a high fiber, high fluid diet for constipation; a low phenylalanine (low in a certain amino acid and therefore low in protein) diet for PKU; a low calorie diet for weight loss; or a diabetic diet?

See Guides 1-2 and 1-3 for practical suggestions to help answer some of the questions through the school lunch program.

Energy Requirements Of Developmentally Disabled Children

In considering caloric needs of the developmentally disabled, the body size, level of activity, and rate of growth are most important. Age is the last factor to be considered. While recognizing the necessity to avoid overweight and obesity, it is important to avoid overrestriction for weight reduction, which may curtail growth in critical periods, and lead to multiple nutrient deficiencies.

Within the physically handicapped population, pronounced differences in growth have been observed. Children with moderate to profound mental retardation frequently are short for their age and commonly have some type of motor dysfunction. These conditions cause their caloric requirement to differ from usual recommendations for children of their age group. While energy requirements for normal children are more directly related to sex and rate of growth, these parameters will not apply to the child with short stature. Here, the child's appearance, body structure, and physical activity are often more reliable indications of caloric needs.

Height is probably the single most important measurement needed for determining energy needs in developmentally disabled children. Guides 1-4 and 1-5 refer to specific developmental disabilities and their basic caloric requirements. However, for much younger or older children it is necessary to monitor the growth rate individually on a height and weight table (see Guide 1-6) and make adjustments to allow for the maintenance of the growth curve while preventing obesity.

Nutritional Management And Assessment Of Developmentally Disabled Children

The major objectives of nutritional intervention with developmentally disabled children are:

1. nutritional rehabilitation of malnourished children,
2. prevention and correction of nutritional deficiencies as they develop,
3. prevention of underweight and overweight,
4. intervention for the treatment of specific feeding problems, and
5. promotion of the development of self-feeding skills.

The nutrition assessment checklist (see Guide 1-7) is one example of a form that school lunch staff and classroom teachers can use to assess the nutritional quality of the diet and the individual feeding skills.

Among the most common feeding problems of developmentally disabled children are:

1. prolonged subsistence on pureed or junior foods, e.g., delayed introduction of solids,
2. difficulty in sucking, swallowing or chewing,
3. unusual food habits,
4. multiple food dislikes, and
5. mealtime tantrums.

In general, a behavioral approach in the management of feeding problems should be used, since it provides incentive for the child to perform and has been proven successful in managing developmentally disabled children. A school psychologist or counselor may be helpful to the teacher and the child in dealing with behavioral problems associated with eating (see Chapter 15 for further information).

Food preferences may be cultivated by giving small amounts of food at the beginning and gradually increasing the size of the serving. It is suggested that the foods be served separately to allow the child to experience different tastes and textures. Efforts should be made to make mealtime a pleasant social occasion. Children learn to like foods when they are associated with happy occasions both in school and at home (see also Chapter 9).

Eating problems may be exhibited by children aged two to six years as "food jags": eating only particular foods, avoiding a variety of foods in their diet, and not allowing foods to be mixed or touching on their plate. In developmentally disabled children these food jags may be delayed into adolescence. Children may favor only foods served at a certain temperature, warm foods are usually favored. Sometimes children prefer foods only if they are prepared in a certain way or only of a certain consistency (e.g., only cooked, not raw). These food jags are generally not harmful, but the parent or caretaker needs to monitor the overall diet for nutritional adequacy.

Early nutritional intervention can prevent or minimize the extent of damage. Individual diet modification is essential. Routine assessment of the diet, feeding skills, and anthropometric measures (measurements of height, weight, and body fat) can be carried out by classroom teachers and parents, with the coordinated input and effort of the school lunch staff.

GUIDE 1-1

FOOD INTAKE PATTERNS FOR OPTIMAL NUTRITION AT DIFFERENT AGE LEVELS*

FOOD GROUP	SERVINGS/ DAY	AVERAGE SIZE SERVINGS									
		0-2 Months	3-4 Months	5-7 Months	8-12 Months	1 Year	2-3 Years	4-5 Years	6-9 Years	10-12 Years	13-16 Years
Milk and Cheese 1c. plain yogurt=1c milk (or 8oz) 1 oz aged cheese=3/4c milk 1 oz processed cheese food= 1/2c milk 1/2c cottage cheese=1/4c milk	4	1/2c-1c** formula (if not breast fed	3/4c-1c** formula with iron (if not breast fed)	3/4 c-1c** formula or homogenized (whole)	3/4c whole milk	3/4c	1/2c	1/2c	3/4c-1c	1c	1c
Meat Group	2										
Egg		-	-	1 Egg Yolk	1 Egg Yolk	1 Egg	1 Egg	1 Egg	1 Egg	1 Egg	1 Egg
Lean meat, Fish, Poultry		-	-	1T	2T	2T	2-3T	4T	4-6T	6-8T	8T
Peanut Butter		-	-	-	-	-	1T	2T	2-3T	3T	3T
Dried Beans, Peas (an occasional replacement)		-	-	-	-	1/4c	1/4c	1/2c	1/2c	3/4c	3/4c
Fruits and Vegetables	4 include:										
Vitamin C source (citrus fruits, berries tomato, cabbage, canteloupe)	1	-	2T	1/4c	1/4c	1/2c	1/2c	1/2c	1/2c or 1 medium orange	1/2c or 1 medium orange	1/2c or 1 medium orange
Vitamin A Source (dark green or deep yellow fruits and vegetables)	1	-	1T	1T	2T	2T	3T	4T	4T	1/3c	1/2c
Other fruits and vegetables	2	-	1T	1T	2T	2T	3T	4T	4T	1/3c	1/2c
Bread or Cereal	4										
Bread		-	-	-	1/2 sl	1/2sl	1 sl	1-1 1/2	1-2 sl	2 sl	2 sl
Cooked Cereal		1T (instant 6 wks)	1T (Instant)	1T	2T	1/4c	1/3c	1/2c	1/2c	3/4c	1c or more
Dry Cereal		-	-	-	-	6T	1/2c	3/4c	3/4c	1c	1c or more
Macaroni, spaghetti, rice		-	-	-	-	1/4c	1/3c	1/2c	1/2c	3/4c	1c or more
Fats and Sweets (non-essential food group)	To be eaten only after minimum recommended servings from other groups are eaten and if energy needs can accommodate the high caloric content of this kind of food.								Some 35 Calorie servings are: 1 t margarine, butter or vegetable oil 1/2 T salad dressing, honey, or syrup 3 oz. soft drink 1 1/2 chocolate kisses 1 piece gingerbread (1/2" x 1/2" x 1")		

*adapted from: Bennett, M.J., and Hansen, A.B.: Four Groups of the Daily Food Guide, Institute of Home Economics, U.S.D.A. publicaton no. 30, Children's Bureau of the U.S. Department of Health, Education, and Welfare.

**Breast feedings or formula feedings alone should be given six times per day.

GUIDE 1-2
Practical Suggestions for Special Diets

Many children with mental retardation and cerebral palsy are given only one texture of food for an extended time period. Although this may be the only food that can be tolerated, it should be pointed out that eating soft foods only can cause poor oral development. Further, in mildly handicapped persons, adherence to a soft diet, can cause a tenderness in the mouth and a refusal by the child to eat anything that is not of a soft consistency.

Change to a different consistency and texture should always be gradual. Avoid pureeing or blending several foods together—this usually appears unappetizing. It is recommended to blend foods individually. Pasta products should be blended with a sauce, gravy, or milk to avoid stickiness.

Dietary Progression for a Handicapped Person

I. Liquid Diets

A. Clear Liquid - a liquid diet allowing only tea, coffee, coffee substitute, fat-free broth, ginger ale, fruit juices, flavored gelatin and fruit ices. The primary purpose of the diet is to relieve thirst and maintain water and mineral balance. This diet is not nutritionally adequate and is given only in special cases before tests are administered or following severe vomiting, diarrhea, or surgery.

1. Foods allowed:
   - clear fruit juices, such as apple or cranberry
   - bouillon, fat-free broth, and consommé
   - tea*, coffee*, carbonated beverage*, fruit flavored drinks*
   - clear and flavored gelatin
   - fruit ices, popsicles, or slushes
2. Sample feeding schedule for clear liquid diet**

8:00 am	1/2 c. cranberry juice 1/2 c. orange flavored drink 3x3 in. square clear flavored gelatin
10:00 am	1/2 c. apple juice
12:00 N	1/2 c. boullion, fat-free broth or consommé 3x3 in. square clear flavored gelatin 1/2 c. fruit slush made with strained fruit juice, crushed ice, 1 tablespoon honey
2:00 pm	1 popsicle
4:00 pm	1/2 c. ginger ale
6:00 pm	1/2 c. boullion, fat-free broth or consommé 3x3 in. square clear flavored gelatin 1/2 c. cranberry juice 1/2 c. fruit slush made with strained fruit juice, crushed ice, 1 tablespoon honey
8:00 pm	1/2 c. apple juice

*Please refer to next page

*These beverages are generally not recommended for children and should only be given if diarrhea, vomiting, fever or dehydration are present. Avoid long-term use.

**This diet is recommended for a young child. Children over ten years of age, may increase intake of such items as the broth, gelatin, slushes, or fruit juices

B. Full Liquid - a nutritionally adequate diet consisting of liquids and foods that liquefy at room temperature.

1. Foods allowed:

Beverages: all beverages are allowed.
Breads and cereals: strained oatmeal and refined cereal gruels such as Cream of Rice, Cream of Wheat, and Farina.
Desserts: custards, fruit whips, gelatins, ices, ice creams, ice milks, popsicles (without fruits and nuts), sherbets, and combinations of these.
Eggs: egg-white whips and eggs in custard, eggnog and pudding.
Fats: butter and margarine in soups, cream, and half-and-half.
Fruits: Juice or blended fruit.
Meat, fish and poultry: bouillon, broth, and clear consommé. Blended meat in broth may be given as tolerated.
Milk and milk products: all milk products are allowed except cheese.
Potato or substitute: strained cream of potato soup.
Soups: bouillon, broth, clear consomme, blended cream soups, or blended vegetable soups.
Sugars and Sweets: honey, plain sugar candy, sugar and syrup.
Vegetables: juices and blended vegetables in broth.
Miscellaneous: salt and flavorings for milk.

2. Sample feeding schedule for full liquid diet.

8:00 am	1/2 c. orange juice
	1/2 c. Cream of Wheat Cereal®
	1 c. milk
	1 T sugar
10:00 am	1/2 c. milk shake
12:00 noon	1/2 c. cream of tomato soup
	1/2 c. blended beef in broth
	1/2 c. milk
	1/2 c. apple juice
2:00 pm	1/2 c. eggnog
4:00 pm	1/2 c. strained oatmeal
	1/2 c. milk
	1 T. sugar
6:00 pm	1/2 c. blended cream of potato soup
	1/2 c. blended chicken in broth
	1/2 c. milk
	1/2 c. grape juice

II. Soft Diet - This diet is nutritionally adequate and is made up of foods that are liquid or do not require chewing. Six small feedings are usually recommended.

This diet is also referred to as a Full Liquid Enriched-Semi Solid Diet or an Enriched Liquid Diet. The consistency may vary.

A. Strained

B. Pureed (In a blender, always use liquid with a solid. If too thick, add liquid, if too thin add unprocessed germ, cream of wheat, grated cheese, dry milk powder, yogurt or other blended foods).

C. Lumpy

D. Fork mashed

Foods allowed within the guidelines of a soft diet:

Beverages: milk in any form, all fruit juices and nectars, tea, coffee, carbonated beverages*, popsicles, fruit flavored drinks*

Bread: white, fine whole wheat, rye without seeds, white crackers

Cereal foods: dry (except bran) and well-cooked breakfast cereals, hominy grits, macaroni, noodles, rice, spaghetti

Dairy products: soft cheeses, cottage and cream cheeses, Cheddar, Swiss, yogurt with added fruit, plain ice cream, ices, sherbets, plain puddings, such as those made with bread, cornstarch, rice, tapioca

Eggs: all except fried

Fats: butter, cream, margarine, vegetable oils and fats in cooking

Fruits: raw: ripe avocado, banana, grapefruit or orange sections without membrane;
canned or cooked (without skins): apples, apricots, fruit cocktail, peaches, pears, plums;
strained: Royal Anne® cherries, prunes, and other fruits with skins

Meat: very tender, minced or ground, baked, broiled, creamed, roasted, or stewed; beef, lamb, veal, poultry, fish, pork, liver, sweetbreads

Soups: broth, strained, creamed, or blended vegetable

Sweets: all sugars, (e.g., syrup, jelly, honey, plain sugar candy, molasses) to be used in moderation; candies with added fruit pieces or nuts are not permitted

Vegetables: unfried white or sweet potato without skin, young and tender asparagus, beets, carrots, peas, pumpkin, squash without seeds, tender chopped greens, strained cooked vegetables if tender, vegetable juices, refried beans

Miscellaneous: salt, seasonings and spices in moderation, gravy, cream sauces

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*These beverages should be served only in moderation and when adequate energy or extra calories are needed in the diet.

III. Moderate - intermediate progression diet.
    A. Soft crisp: breadsticks, crackers, toast, grahams
    B. Finely cut, ground or hand chopped
    C. Soft chewy: hot dog (no casing), banana, smooth cold cut—no large meat chunks

IV. Hard - a varied consistency diet leading to normal food intake.
    A. Sticky: marshmallows, peanut butter
    B. Firm chewy: meat
    C. Combination foods: soup, casseroles
    D. Hard crisp: popcorn, peanuts

GUIDE 1-3

PREPARED BY: ____________________

NAME: ______________________

DATE: ______________________

DIETARY RECOMMENDATIONS

(RECOMMENDATIONS FOR FOOD SERVICE PERSONNEL, PARENTS AND CARETAKERS)

CHOPPED DIET RECOMMENDATIONS	GROUND DIET RECOMMENDATIONS	REGULAR DIET RECOMMENDATIONS
Food must be cut into bite size pieces, finger foods are acceptable.	Food must be cut finely or be soft and small enough to swallow without chewing.	May Choose any item from menu.
Quartered Hamburger or sandwiches Pizza Cut-up Spaghetti or Cavantini w/Meat Sauce or Meat Balls Softed Shelled Taco French Fried Potatoes Potato Salad Baked Beans Cottage Cheese,Macaroni Salad, Jello Whipped or w/Diced Fruits, Fine Ground Coleslaw, Glorified Rice Ice Cream, Cake, Cookies, Diced Fruit Pudding Pop, Milk, Tea, Malts, Coffee, Hot Chocolate	Cut-up Spaghetti or Cavantini w/ Ground Meat Sauce Ground Meat Salad w/Bread on the side Egg Salad w/Bread on the side Tuna Salad w/Bread on the side Bar-B-Q (Grd. Fine) w/Bread on the side Creamed Tuna over Whipped Potatoes Soft-Shelled Taco (Broken into Tiny Pieces, omit Lettuce,Tomato, Onions Creamed Soup w/Crackers Cottage Cheese, Macaroni Salad, Jello Whipped or w/Diced Fruits, Fine Ground Coleslaw, Glorified Rice Ice Cream, Cake, Cookies, Diced Fruit without skins Pop, Milk, Tea, Malts, Coffee, Hot Chocolate	Regular school meals and calorie controlled diets are not a consideration for this meal.
Example of items not recommended: Tossed Salad, Nuts, Chicken, Shrimp, Fish, Submarine Sandwich	Example of items not recommended: French Fries, Tossed Salad, Nuts, Hamburgers, Hot Dogs, Buns, Raw Vegetables	

BLAND DIETS: Bland diets should be individually prescribed. Unless otherwise specified, omit spicy and fatty foods.

LOW SODIUM DIETS - Depending on the degree of restriction, in general, omit salty food and added salt.

SPECIAL CONSIDERATIONS

Guide 1-4

ESTIMATIONS FOR CALORIC REQUIREMENTS FOR DOWN SYNDROME

Boys

Age in Years	Weight kg	Weight lbs.	Height cm.	Height in.	Calories Per kg	Calories Per cm	Calories Per Person Per Day	Calorie Range
1- 3	13	29	90	35	100	14.4	1300	(900-1800)
4- 6	20	44	112	44	85	14.5	1700	(1300-2300)
7-10	28	62	132	52	85	18.2	2400	(1650-3300)
11-14	45	99	157	62	60	17.2	2700	(2000-3700)
1- 3	11	24	81	32	118	16.1	1300	(1100-1500)
4- 6	15	34	99	39	106	16.1	1600	(1600-1700)
7-10	20	43	107	42	85	16.1	1700	(1700-1900)
11-14	26	58	124	49	76.9	16.1	2000	(1900-2100)

Girls

1- 3	13	29	90	35	100	14.4	1300	(900-1800)
4- 6	20	44	112	44	85	14.5	1700	(1300-2300)
7-10	28	62	132	52	85	18.2	2400	(1650-3300)
11-14	46	101	157	62	48	14.0	2200	(1500-3000)
1- 3	9	20	81	32	133	14.3	1200	(1000-1300)
4- 6	15	32	104	41	100	14.3	1500	(1400-1500)
7-10	21	46	119	47	80.9	14.3	1700	(1600-1800)
11-14	31	69	132	52	61	14.3	1900	(1800-2000)

*Estimations based on Down syndrome growth curves taken from Springer, N.S., Nutrition Casebook on Developmental Disabilities, Syracuse, N.Y., 1982, pp. 51-53.

GUIDE 1-5

ESTIMATED CALORIE REQUIREMENTS FOR SPECIFIC DEVELOPMENTAL DISABILITIES
(according to individual heights)

DEVELOPMENTAL DISABILITY	GUIDE FOR CALORIC INTAKE
Down Syndrome: Results from an extra #21 chromosome causing developmental problems such as congenital heart disease, mental retardation, small stature, and decreased muscle tone.	16.1 kcal/cm (40.9 kcal/in)--boys 14.3 kcal/cm (36.3 kcal/in)--girls (See Guide 1-4. Estimations for caloric requirements for Down syndrome)
Prader-Willi Syndrome: A disorder characterized by uncontrollable eating habits, inability to distinguish hunger from appetite, severe obesity, poorly developed genitalia and moderate to severe mental retardation.	10-11 kcal/cm (26.7 kcal/in) for maintenance 8.5 kcal/cm (21.6 kcal/in) for weight loss
Spina Bifida (Myelomeningocele) Results from a midline defect of the skin, spinal column, and spinal cord, characterized by hydrocephalus, mental retardation and lack of muscular control.	7 kcal/cm (17.78 kcal/in) for weight loss and as low as 500 kcal/day--for severely immobilized, As a general recommendation use 50% of the kcal level of a normal child.
Cerebral Palsy: A disorder of muscle control or coordination resulting from injury to the brain during its early (fetal, perinatal, and early childhood) stages of development. There may be associated problems with with intellectual, visual or other functions.	13.9 cal/cm (35.3 kcal/in)--5-11 yrs. mild-to-moderate activity level 11.1 cal/cm (28.2 kcal/in)--5-11 yrs. severe restrictions in activity

GUIDE 1-6

AVERAGE HEIGHTS AND WEIGHTS FOR NORMAL PERSONS

	Age	Weight		Height	
	(years)	(kg)	(lbs)	(cm)	(in)
Infants	0.0-0.5	6	13	60	24
	0.5-1.0	9	20	71	28
Children	1-3	13	29	90	35
	4-6	20	44	112	44
	7-10	28	62	132	52
Males	11-14	45	99	157	62
	15-18	66	145	176	69
	19-22	70	154	177	70
	23-50	70	154	178	70
	51+	70	154	178	70
Females	11-14	46	101	157	62
	15-18	55	120	163	64
	19-22	55	120	163	64
	23-50	55	120	163	64
	51+	55	120	163	64

GUIDE 1-7
NUTRITION ASSESSMENT CHECKLIST

Name____________________________ Diagnosis____________________

Date______________Age__________ Height__________Weight______

	FOOD RECORD		FEEDING SKILLS ASSESSMENT			
	FOOD/CONSISTENCY	AMOUNT EATEN		Observations		
Breakfast Time: _____ to Where:____ With Whom: __________ __________			Breathes through mouth Sits with good head control Lip closure occurs Can protrude tongue Can move tongue side-to-side easily Can elevate tongue			
Mid-Morning Snack			Control of drooling Removes food from spoon with lips, not teeth Chews with rotary motion of jaw			
Lunch Time: _____ to Where:____ With Whom: __________ __________			Swallows w/out choking/ gagging Can straw suck Drinks from cup (in part) Holds own cup (spills easily) Holds own cup (few spills) Holds own cup by handles drinks well			
Afternoon Snack			Has hand-to-mouth movements Finger feeds Uses spoon (spills frequently)			
Supper Time: _____ to Where:____ With Whom: __________ __________			Uses Spoon (few spills) Fills spoon, brings to mouth and eats Uses fork Uses knife Feeds self using utensils Eats rapidly			
Evening Snack			Key: X adequate / attempt + with help - unable to do 0 not observed			

Nutritional Status of the Handicapped Child

2

NUTRITIONAL STATUS OF THE HANDICAPPED CHILD

To assess the nutritional status of a child and to determine adequate nutrition requires information on dietary intake, a physical examination, and laboratory tests. As soon as a nutritional deficiency is suspected, a full assessment should be done by a physician and a registered dietitian, who have skills in working with the handicapped.

Collection Of Dietary Information

A special education teacher, school nurse, or a parent can assist the physician and dietitian in assessing nutritional status by observing and recording the child's actual food intake, excluding what falls on the tray, drops to the floor, or stays on the clothing or the bib apron, if one is used. This includes careful recording of the following:

1. the specific type and amount of food and liquid actually consumed
2. the way it was prepared (pureed, cut up, whole)
3. the food lost from utensils or from the mouth due to limited motor control or difficulties in swallowing
4. the physical effort required for eating
5. the time needed to finish a meal or snack
6. the time of day and the location where the meal is eaten, and
7. the vitamin, mineral or other food supplements taken.

Considerations In Recording Food Intake

If a teacher, parent, or other person feeds a child, the amounts of food are estimated using household measures in cups, tablespoons, teaspoons, etc. Terms like "bites" or "chews" provide little information to determine nutritional adequacy. The recorder of the food diary needs to be trained to estimate portions accurately, and to be aware that the record keeping can influence the food choices of the child. When used properly and on-going, a food diary is the most reliable method of dietary data collection. For problem eaters and underweight children, it is recommended that a food diary be maintained for at least three days during the week. Patterns in eating, as well as caloric intake can be best monitored in this way. Guides 2-1, 2-2, and 2-3 can be used to record the food intake of children exhibiting problem eating.

Evaluation Of Dietary Information

Evaluation of an individual's dietary intake can be done by comparing the food intake to the Basic Four Food Groups (see Guide 2-4) or to the Recommended Dietary Allowances (RDA) (see Guide 2-5).

Evaluation of dietary information should be performed by a trained nutrition professional or a registered dietitian. Classroom teachers or nurses may acquaint themselves with observing and recording this information, and may be responsible for this daily task.

It must be remembered that the Basic Four Daily Food Guide reflects minimum amounts needed to provide adequate diet for healthy individuals and may not necessarily reflect the needs of the handicapped individual. The diet evaluator must also consider prescribed vitamin, mineral, or food supplements.

Computer Utilization To Assess Nutritional Status

Nutrient calculations can be made by hand or by using a computer. Computers are becoming increasingly important in providing dietary analysis, and large nutrient composition data banks have been developed. Several computer programs for personal computers, found in many schools, have been developed. These programs can print out nutrient values, compare an individual's intake with the Recommended Dietary Allowances (RDA), and make recommendations for change.

It is not appropriate to determine that a person has a dietary deficiency based upon diet information alone. The existence or absence of a deficiency can only be determined by a combination of dietary, physical, and laboratory information.

Physical Assessment

Physical assessment involves a search for signs and symptoms of malnutrition. Information needed may include the medical history, physical examination, anthropometric measurements and dental and radiographic examinations, as well as laboratory tests.

The physical examination should include measurements of body length, weight, and head circumference, as well as observations of physical signs indicative of malnutrition such as abnormalities of the skin, hair, and mucous membranes. Also, the physical examination may reveal a feeding difficulty such as neuromuscular dysfunction (inability to suck, chew or hold up the head), malformed or missing limbs, abnormal or diseased oral cavity or teeth, that could be contributory to malnutrition. (For information on dental health see Chapter 16).

Measurements of body fat levels and height and weight (anthropometric measurements) may be difficult to obtain or interpret for the handicapped child. Some handicapped persons have an unusual body composition, abnormal body proportions, missing limbs, or growth disturbances. Comparing height and weight measurements with standard charts has only limited value in many cases. It is better to simply compare the child to himself by watching that growth does take place continuously. It is recommended that the same person weigh the individual using the same scale each time to provide constancy. Generally the school nurse or classroom teacher is the most appropriate person to do this on-going weighing. Guide 2-6 outlines suggested triceps skinfold measurements for normal persons. (See Guide 1-6 for height/weight measurements). Guide 2-7 outlines the body frame determination according to wrist size for height.

Malnutrition may be caused by lack of one or more nutrients or by other problems such as poor absorption of nutrients by the gastrointestinal tract. Physical findings that suggest nutritional inadequacy should be considered a clue and not a diagnosis. Physical findings and diet intake alert the physician and registered dietitian to undertake additional studies, such as laboratory analysis to determine the significance of the findings. If malnutrition is suspected, a physician should be contacted immediately. Guide 2-8 provides an overview of the parts of the body in which malnutrition can manifest itself.

Challenges For The School

The actual nutritional assessment is the task for the physician and registered dietitian, although parents, teachers, and school health professionals may be needed to record food intake of handicapped children identified as a nutritional risk. It may be necessary to record this information routinely. Height and weight record may also be needed on a regular basis for the problem eaters and special needs children.

GUIDE 2-1 DIETARY QUESTIONNAIRE

(May be completed by classroom teacher with parent or school nurse if a registered dietitian is not available. This information may be helpful to physician and other health professionals when determining overall health status.)

NAME______________________________ AGE________ TODAY'S DATE________

HEIGHT_________ CURRENT WEIGHT________ HAS THE CHILD HAD ANY RECENT

WEIGHT LOSS OR GAIN?_________ IF YES, HOW MUCH_______( )LOSS ( ) GAIN

LIST ANY DIETARY RESTRICTIONS______________________________________

____

LIST ANY ALLERGIES OR INTOLERENCES TO FOODS__________________________

LIST ANY MEDICATIONS AND SPECIFY LENGTH OF TIME THE CHILD HAS BEEN ON THEM ____

IS THE CHILD TAKING A VITAMIN?______IF YES, WHAT KIND AND HOW MUCH?____

____

LIST ANY PHYSICAL PROBLEMS THE CHILD MAY BE HAVING WITH EATING*________

____

LIST ANY SELF HELP DEVICES BEING USED*_____________________________

____

DO YOU HAVE ANY PROBLEMS CHEWING FOOD?*( )YES ( )NO__________________

DO YOU HAVE ANY PROBLEMS SWALLOWING FOOD?*( )YES ( )NO________________

HOW WOULD YOU RATE THE PHYSICAL EFFORT IT TAKES TO EAT A MEAL?*
( )LOW EFFORT ( )AVERAGE EFFORT ( )MUCH EFFORT

HOW LONG DOES IT TAKE TO COMPLETE A MEAL?___________________________

DOES THE CHILD EAT REGULARLY?___________________ HOW MANY MEALS A DAY DOES THE CHILD EAT?____

____

HOW IS THE FOOD PREPARED? WHOLE, CUT UP, PUREED?____________________

WHAT PERCENT OF THE FOOD SERVED IS USUALLY EATEN?____________________

WHAT PERCENT OF FOOD SERVED IS LOST FROM UTENSIL OR MOUTH?__________

*If problems are indicated here, refer to Chapter 13 on Feeding and Swallowing.

(Adapted from Handbook of Clinical Dietetics, The American Dietetic Association, Yale University Press, 1981, p. 23.)

GUIDE 2-2

FOOD DIARY OR 24-HOUR INTAKE RECALL FORM

(This form may be completed by parents and compared with the teacher's records if a child is a problem eater.)

NAME______________________________ DATE______________

Please list any vitamin or mineral supplements taken____________________________

TIME OF EATING begin/finish	WHERE FOOD IS EATEN	FOOD ITEM	HOW IT IS PREPARED	AMOUNT EATEN	AMOUNT LOST FROM UTENSIL, MOUTH, OR TO THE FLOOR, TRAY OR BIB
EXAMPLE: 8:00/8:30am	home/kitchen	cream of wheat	warm with whole milk and sugar	1/2 cup cereal 1/4 cup milk 1 tsp. sugar	3-4 teaspoons

(Adapted from M.D. Simko, C. Cowell, J.A. Bilbride, Nutrition Assessment, Aspen Systems Corporation, Maryland, 1984, p. 122).

GUIDE 2-3

FOOD FREQUENCY CHECKLIST

(Parents or teachers may want to monitor if a child is eating a variety of foods, the following checklist provides an overview of foods and textures that a child may eat. If only a few foods and textures are being consumed for a year or longer and there is accompanying weight loss or no gain with length growth, a physician should be contacted.)

	Food	No. of servings per week	Seldom eat	Never eat
1.	Dark green vegetables			
	Dark yellow vegetables			
	Other green vegetables			
	Other vegetables (list type):			
2.	Bread (type)			
	Wheat germ			
	Cereal (type)			
	Pasta (type)			
	Potato			
	Other grain (type)			
	Pancakes			
3.	Citrus fruit or juice			
	Other fruits			
	Tomatoes			
	Dried fruits			
4.	Milk (type)			
	Yogurt			
	Cheese (type)			
5.	Oil (type)			
	Margarine			
	Butter			
	Salad dressing			
	Bacon and sausage			
	Fried foods			
	Salt pork			
	Cream, sweet			
	Cream, sour			
6.	Beef, hamburger			
	Pork, ham			
	Liver			
	Luncheon meat			

Franks			
Pizza			
Poultry			
Eggs			
Peanut butter			
Dried peas/beans			
Nuts			
Seeds			
Sprouts			
7. Candy			
Pie, cake, cookies, brownies			
Potato chips, pretzels popcorn, etc.			
Teas/sugar			
Coffee/sugar			
Soft drinks			
Kool-aid®			
Ice cream			
Ice milk			
Sherbet			

8. Other foods not listed that you eat regularly (e.g., Supplements, Instant Breakfast Drinks, vitamins.)

(Adapted from M.D. Simko, C. Cowell, J.A. Bilbride, Nutrition Assessment, Aspen Systems Corporation, Maryland, 1984, p. 122.)

GUIDE 2-4

BASIC FOOD GROUPS

Every day, select foods from each of the basic food groups in lists 1–5, and follow the recommendations for number and size of servings.

1 MEAT POULTRY FISH DRIED BEANS and PEAS NUTS • EGGS

1 serving . . .
3-4 ounces of cooked meat or fish (not including bone or fat) or 3-4 ounces of a vegetable listed here

Use 2 or more servings (a total of 6-8 ounces) daily

RECOMMENDED

Chicken • turkey • veal • fish • in most of your meat meals for the week.

Shellfish: clams • crab • lobster • oysters • scallops • shrimp • are low in fat but high in cholesterol. Use a 4-ounce serving in a meat meal no more than twice a week.

Beef • lamb • pork • ham • in no more than 5 meals per week.

Choose lean ground meat and lean cuts of meat • trim all visible fat before cooking • bake, broil, roast, or stew so that you can discard the fat which cooks out of the meat.

Nuts and dried beans and peas:

Kidney beans • lima beans • baked beans • lentils • chick peas (garbanzos) • split peas • are high in vegetable protein and may be used in place of meat occasionally.

Egg whites as desired.

AVOID OR USE SPARINGLY

Duck • goose

Heavily marbled and fatty meats • spare ribs • mutton • frankfurters • sausages • fatty hamburgers • bacon • luncheon meats.

Organ meats: liver • kidney • heart • sweetbreads • are very high in cholesterol. Since liver is very rich in vitamins and iron, it should not be eliminated from the diet completely. Use a 4-ounce serving in a meat meal no more than once a week.

Egg yolks: limit to 3 per week including eggs used in cooking.

Cakes, batters, sauces, and other foods containing egg yolks.

2 VEGETABLES and FRUIT

(Fresh, frozen, or canned)

1 serving . . . ½ cup
Use at least 4 servings daily

RECOMMENDED

One serving should be a source of Vitamin C:
Broccoli • cabbage (raw) • tomatoes. Berries • cantaloupe • grapefruit (or juice) • mango • melon • orange (or juice) • papaya • strawberries • tangerines.

One serving should be a source of Vitamin A—dark green leafy or yellow vegetables, or yellow fruits:
Broccoli • carrots • chard • chicory • escarole • greens (beet, collard, dandelion, mustard, turnip) • kale • peas • rutabagas • spinach • string beans • sweet potatoes and yams • watercress • winter squash • yellow corn.
Apricots • cantaloupe • mango • papaya.

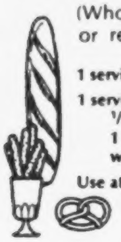
Other vegetables and fruits are also very nutritious; they should be eaten in salads, main dishes, snacks, and desserts, *in addition* to the recommended daily allowances of high vitamin A and C vegetables and fruits. If you must limit your calories, use a serving of potatoes, yellow corn, or fresh or frozen cooked lima beans in place of a bread serving.

AVOID OR USE SPARINGLY

Olives and avocados are very high in fat calories and should be used in moderation.

3 BREAD and CEREALS

(Whole grain, enriched, or restored)



1 serving of bread . . . 1 slice

1 serving of cereal . . .
⅓ cup, cooked
1 cup, cold,
with skimmed milk

Use at least 4 servings daily

RECOMMENDED

Breads made with a minimum of saturated fat:
White enriched (including raisin bread) • whole wheat • English muffins • French bread • Italian bread • oatmeal bread • pumpernickel • rye bread.

Biscuits, muffins, and griddle cakes made at home, using an allowed liquid oil as shortening.

Cereal (hot and cold) • rice • melba toast • matzo • pretzels.

Pasta: macaroni • noodles (except egg noodles) • spaghetti.

AVOID OR USE SPARINGLY

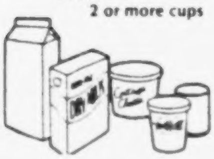
Butter rolls • commercial biscuits, muffins, donuts, sweet rolls, cakes, crackers • egg bread, cheese bread • commercial mixes containing dried eggs and whole milk.

4 MILK PRODUCTS

1 serving . . . 8 ounces (1 cup)

Buy only skimmed milk that has been fortified with Vitamins A and D.

Daily servings:
Children up to 12 . . .
3 or more cups
Teenagers . . .
4 or more cups
Adults . . .
2 or more cups



RECOMMENDED

Milk products that are low in dairy fats:

Fortified skimmed (non-fat) milk and fortified skimmed milk powder • low-fat milk. The label on the container should show that the milk is fortified with Vitamins A and D. The word "fortified" alone is not enough.

Buttermilk made from skimmed milk • yogurt made from skimmed milk • canned evaporated skimmed milk • cocoa made with low-fat milk.

Cheeses made from skimmed or partially skimmed milk, such as cottage cheese, creamed or uncreamed (uncreamed, preferably) • farmer's, baker's, or hoop cheese • mozarella and sapsago cheeses made with partially skimmed milk.

AVOID OR USE SPARINGLY

Whole milk and whole milk products:

Chocolate milk • canned whole milk • ice cream • all creams including sour, half and half, whipped • whole milk yogurt.

Non-dairy cream substitutes (usually contain coconut oil which is very high in saturated fat)

Cheeses made from cream or whole milk.

Butter.

5 FATS and OILS

(Polyunsaturated)

An individual allowance should include about 2-4 tablespoons daily (depending on how many calories you can afford) in the form of margarine, salad dressing, and shortening.

RECOMMENDED

Margarines, liquid oil shortenings, salad dressings and mayonnaise containing any of these polyunsaturated vegetable oils:

Corn oil • cottonseed oil • safflower oil • sesame seed oil • soybean oil • sunflower seed oil.

Margarines and other products high in polyunsaturates can usually be identified by their label which lists a recommended *liquid* vegetable oil as the *first* ingredient, and one or more partially hydrogenated vegetable oils as additional ingredients.

Diet margarines are low in calories because they are low in fat. Therefore it takes twice as much diet margarine to supply the polyunsaturates contained in a recommended margarine.

AVOID OR USE SPARINGLY

Solid fats and shortenings:

Butter • lard • salt pork fat • meat fat • completely hydrogenated margarines and vegetable shortenings • products containing coconut oil.

Peanut oil and olive oil may be used occasionally for flavor, but they are low in polyunsaturates and do not take the place of the recommended oils.

Dairy Council of the United States. As taken from Nutrition in Preventive Dentistry, Science and Practice, 2nd edition. By Abraham E. Nizel, D.M.D., M.S.D, F.A.C.D. W.B. Saunders Co., 1981.

GUIDE 2-5

FOOD AND NUTRITION BOARD, NATIONAL ACADEMY OF SCIENCES–NATIONAL RESEARCH COUNCIL RECOMMENDED DAILY DIETARY ALLOWANCES,[a] Revised 1980

Designed for the maintenance of good nutrition of practically all healthy people in the U.S.A.

							Fat-Soluble Vitamins			Water-Soluble Vitamins							Minerals					
	Age (years)	Weight (kg)	Weight (lb)	Height (cm)	Height (in)	Protein (g)	Vitamin A (µg RE)[b]	Vitamin D (µg)[c]	Vitamin E (mg α-TE)[d]	Vitamin C (mg)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg NE)[e]	Vitamin B-6 (mg)	Folacin[f] (µg)	Vitamin B-12 (µg)	Calcium (mg)	Phosphorus (mg)	Magnesium (mg)	Iron (mg)	Zinc (mg)	Iodine (µg)
Infants	0.0–0.5	6	13	60	24	kg × 2.2	420	10	3	35	0.3	0.4	6	0.3	30	0.5[g]	360	240	50	10	3	40
	0.5–1.0	9	20	71	28	kg × 2.0	400	10	4	35	0.5	0.6	8	0.6	45	1.5	540	360	70	15	5	50
Children	1–3	13	29	90	35	23	400	10	5	45	0.7	0.8	9	0.9	100	2.0	800	800	150	15	10	70
	4–6	20	44	112	44	30	500	10	6	45	0.9	1.0	11	1.3	200	2.5	800	800	200	10	10	90
	7–10	28	62	132	52	34	700	10	7	45	1.2	1.4	16	1.6	300	3.0	800	800	250	10	10	120
Males	11–14	45	99	157	62	45	1000	10	8	50	1.4	1.6	18	1.8	400	3.0	1200	1200	350	18	15	150
	15–18	66	145	176	69	56	1000	10	10	60	1.4	1.7	18	2.0	400	3.0	1200	1200	400	18	15	150
	19–22	70	154	177	70	56	1000	7.5	10	60	1.5	1.7	19	2.2	400	3.0	800	800	350	10	15	150
	23–50	70	154	178	70	56	1000	5	10	60	1.4	1.6	18	2.2	400	3.0	800	800	350	10	15	150
	51 +	70	154	178	70	56	1000	5	10	60	1.2	1.4	16	2.2	400	3.0	800	800	350	10	15	150
Females	11–14	46	101	157	62	46	800	10	8	50	1.1	1.3	15	1.8	400	3.0	1200	1200	300	18	15	150
	15–18	55	120	163	64	46	800	10	8	60	1.1	1.3	14	2.0	400	3.0	1200	1200	300	18	15	150
	19–22	55	120	163	64	44	800	7.5	8	60	1.1	1.3	14	2.0	400	3.0	800	800	300	18	15	150
	23–50	55	120	163	64	44	800	5	8	60	1.0	1.2	13	2.0	400	3.0	800	800	300	18	15	150
	51 +	55	120	163	64	44	800	5	8	60	1.0	1.2	13	2.0	400	3.0	800	800	300	10	15	150
Pregnant						+30	+200	+5	+2	+20	+0.4	+0.3	+2	+0.6	+400	+1.0	+400	+400	+150	h	+5	+25
Lactating						+20	+400	+5	+3	+40	+0.5	+0.5	+5	+0.5	+100	+1.0	+400	+400	+150	h	+10	+50

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[a] The allowances are intended to provide for individual variations among most normal persons as they live in the United States under usual environmental stresses. Diets should be based on a variety of common foods in order to provide other nutrients for which human requirements have been less well defined. See text for detailed discussion of allowances and of nutrients not tabulated. See Table 1 (p. 20) for weights and heights by individual year of age. See Table 3 (p. 23) for suggested average energy intakes.

[b] **Retinol equivalents.** 1 retinol equivalent = 1 µg retinol or 6 µg β carotene. See text for calculation of vitamin A activity of diets as retinol equivalents.

[c] As cholecalciferol. 10 µg cholecalciferol = 400 IU of vitamin D.

[d] α-tocopherol equivalents. 1 mg *d*-α tocopherol = 1 α-TE. See text for variation in allowances and calculation of vitamin E activity of the diet as α-tocopherol equivalents.

[e] 1 NE (niacin equivalent) is equal to 1 mg of niacin or 60 mg of dietary tryptophan.

[f] The folacin allowances refer to dietary sources as determined by *Lactobacillus casei* assay after treatment with enzymes (conjugases) to make polyglutamyl forms of the vitamin available to the test organism.

[g] The recommended dietary allowance for vitamin B-12 in infants is based on average concentration of the vitamin in human milk. The allowances after weaning are based on energy intake (as recommended by the American Academy of Pediatrics) and consideration of other factors, such as intestinal absorption; see text.

[h] The increased requirement during pregnancy cannot be met by the iron content of habitual American diets nor by the existing iron stores of many women; therefore the use of 30–60 mg of supplemental iron is recommended. Iron needs during lactation are not substantially different from those of nonpregnant women, but continued supplementation of the mother for 2–3 months after parturition is advisable in order to replenish stores depleted by pregnancy.

GUIDE 2-6

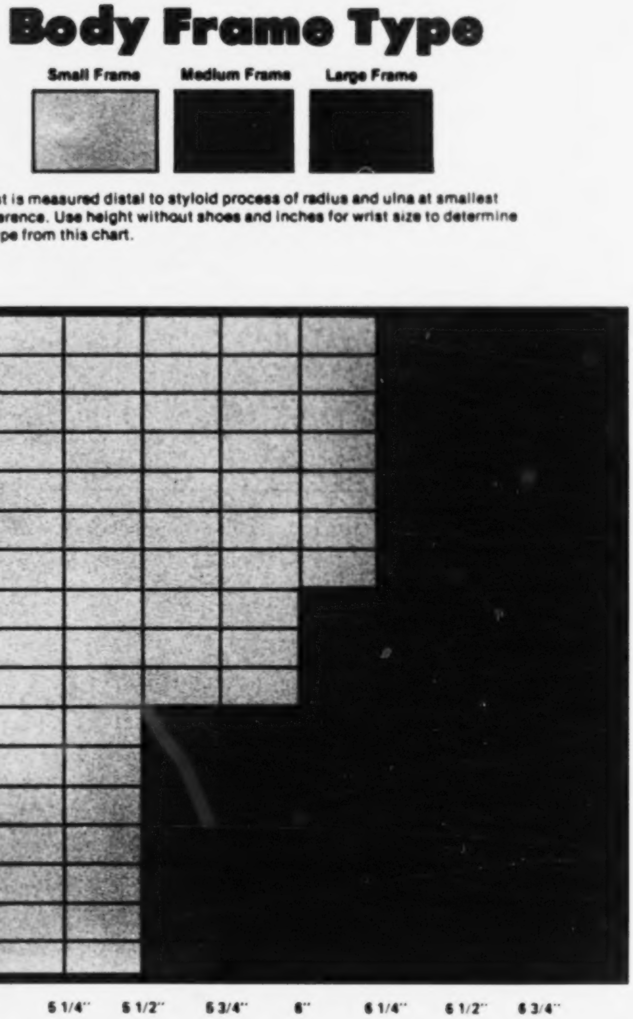
Triceps Skinfold Percentiles (mm^2)

	Males								Females							
Age group	*n*	*5*	*10*	*25*	*50*	*75*	*90*	*95*	*n*	*5*	*10*	*25*	*50*	*75*	*90*	*95*
1– 1.9	228	6	7	8	10	12	14	16	204	6	7	8	10	12	14	16
2– 2.9	223	6	7	8	10	12	14	15	208	6	8	9	10	12	15	16
3– 3.9	220	6	7	8	10	11	14	15	208	7	8	9	11	12	14	15
4– 4.9	230	6	6	8	9	11	12	14	208	7	8	8	10	12	14	16
5– 5.9	214	6	6	8	9	11	14	15	219	6	7	8	10	12	15	18
6– 6.9	117	5	6	7	8	10	13	16	118	6	6	8	10	12	14	16
7– 7.9	122	5	6	7	9	12	15	17	126	6	7	9	11	13	16	18
8– 8.9	117	5	6	7	8	10	13	16	118	6	8	9	12	15	18	24
9– 9.9	121	6	6	7	10	13	17	18	125	8	8	10	13	16	20	22
10–10.9	146	6	6	8	10	14	18	21	152	7	8	10	12	17	23	27
11–11.9	122	6	6	8	11	16	20	24	117	7	8	10	13	18	24	28
12–12.9	153	6	6	8	11	14	22	28	129	8	9	11	14	18	23	27
13–13.9	134	5	5	7	10	14	22	26	151	8	8	12	15	21	26	30
14–14.9	131	4	5	7	9	14	21	24	141	9	10	13	16	21	26	28
15–15.9	128	4	5	6	8	11	18	24	117	8	10	12	17	21	25	32
16–16.9	131	4	5	6	8	12	16	22	142	10	12	15	18	22	26	31
17–17.9	133	5	5	6	8	12	16	19	114	10	12	13	19	24	30	37
18–18.9	91	4	5	6	9	13	20	24	109	10	12	15	18	22	26	30
19–24.9	531	4	5	7	10	15	20	22	1060	10	11	14	18	24	30	34
25–34.9	971	5	6	8	12	16	20	24	1987	10	12	16	21	27	34	37
35–44.9	806	5	6	8	12	16	20	23	1614	12	14	18	23	29	35	38
45–54.9	898	6	6	8	12	15	20	25	1047	12	16	20	25	30	36	40
55–64.9	734	5	6	8	11	14	19	22	809	12	16	20	25	31	36	38
65–74.9	1503	4	6	8	11	15	19	22	1670	12	14	18	24	29	34	36

Source: A. Roberto Frisancho, "New Norms of Upper Limb Fat and Muscle Areas for Assessment of Nutritional Status," *American Journal of Clinical Nutrition* 34 (1981): 2541. Reprinted with permission of *American Journal of Clinical Nutrition* and A. Roberto Frisancho.

GUIDE 2-7

Body Frame Types*



The wrist is measured distal to styloid process of radius and ulna at smallest circumference. Use height without shoes and inches for wrist size to determine frame type from this chart.

Source: Anne Grant, *Nutritional Assessment Guidelines* (Seattle, Wash.: Anne Grant, 1979), p. 7. Reprinted with permission of Peter G. Lindner, M.D. © 1973.

*For a number of years, the method of determining body frame size has been wrist measurement, as noted in this bar chart. Recently, elbow width has been used. Specific charts for frame determination based on elbow measurement are available from the Metropolitan Life Insurance Company.

GUIDE 2-8

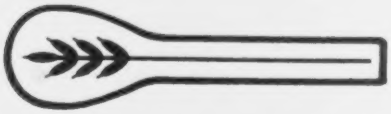
PHYSICAL SIGNS OF MALNUTRITION

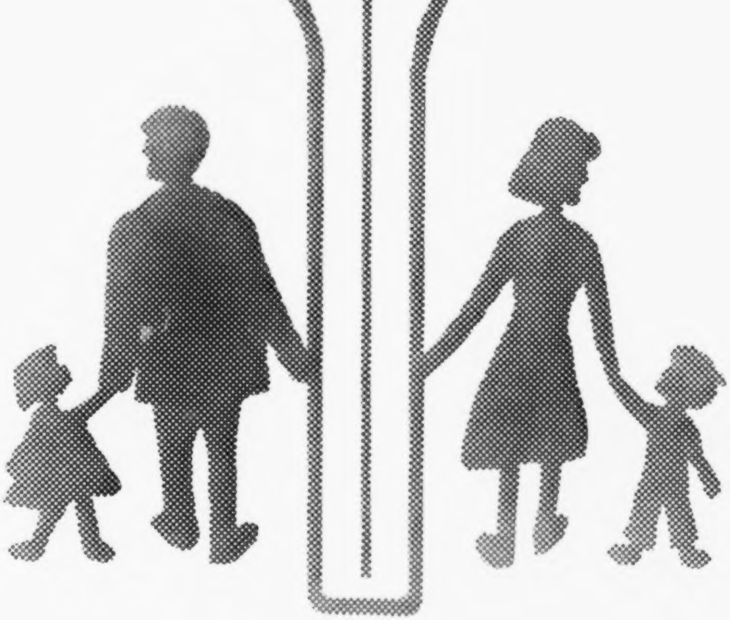
Physical signs of malnutrition can be manifested in abnormal appearances or changes in:

1. hair
2. face
3. eyes
4. lips
5. tongue
6. gums
7. skin
8. nails
9. bone structure

If parents or teachers suspect abnormalities, a school nurse or physician should be contacted.

Note that some genetic abnormalities may cause some abnormal appearances in hair, face, eyes, lips, tongue, and bone structure. These should not be confused with malnutrition. When in question, contact a physician.





Vitamins

3

VITAMINS

Vitamins are essential for growth and normal body processes for both the handicapped and non-handicapped individual. The absence of a vitamin in food will cause specific deficiency states. Several of the fat-soluble vitamins, especially A and D (see Guide 3-1), if given in overdose will cause toxic symptoms. When giving vitamin amounts over the Recommended Dietary Allowances (RDA) caution and medical supervision are advised. Handicapped persons maintaining a well-balanced dietary intake do not need vitamin supplements. Rarely are individuals found to have a vitamin dependency state, which means they are lacking certain enzymes to utilize properly specific vitamins, which then have to be given in larger than normal doses to make up for that deficiency.

Vitamin Deficiencies

In order to give reliable information on the needed amounts of vitamins the Food and Nutrition Board of the National Academy of Sciences, National Research Council, periodically publishes Recommended Dietary Allowances (RDA) for vitamins. These are found in Guide 3-2. There are no specific RDA vitamin listings for handicapped persons. Guide 3-3 is a listing of food sources for each vitamin.

Vitamin deficiencies in the United States are rare because of programs such as National School Lunch Program (NSLP), and Women, Infant, and Children (WIC) Supplemental Feeding Program. In addition, food fortification and supplementation has helped to alleviate vitamin deficiencies in this country. The most common vitamin deficiencies of handicapped children occur with vitamins C and D.

If a vitamin deficiency is suspected, the child should be referred to physicians who are not only familiar with vitamin deficiencies but also have appropriate laboratory facilities at their disposal. In order to make a diagnosis, the physician, along with the assistance of a registered dietitian, will require an accurate and extensive dietary history, vitamin intake, a family history, blood vitamin levels, and an investigation into the physical findings. Guide 3-4 outlines major vitamin deficiency signs. Caution is advised, if a diagnosis of vitamin deficiency, especially multiple deficiency states, is made without laboratory tests.

Common Vitamin Fallacies

The handicapped population is a target group for many of the popular vitamin fallacies and other faddisms. Parents, teachers, and food service personnel should be aware of the known facts. It has been claimed that certain vitamins, often given in excessive doses, are beneficial for the intellectual and physical development of the developmentally disabled. The so called "Megavitamin" therapy (treatment with very high doses of vitamins) is especially dangerous as it can cause toxic symptoms, such as vomiting, headaches, blurred vision, diarrhea, muscle weakness, fatigue, calcifications of muscles, tendons, and ligaments and other effects. Children with Down syndrome are particularly the subject of such allegedly favorite claims especially involving B_6 and E vitamins, or mixing of multiple vitamins in very high doses. On the other side, there are very few diseases caused by an enzyme deficiency--and about three of these are associated with developmental disabilities--where large amounts of a certain fat-insoluble vitamin are able to compensate for and to increase the activity of the deficient enzyme.

Toxic symptoms for Vitamin C have not been reported, but a few severe kidney problems are known to have occurred with high doses. On the other hand, there are no known benefits of high Vitamin C doses. As a matter of fact, it has been shown that Vitamin C in high doses does not result in a lesser frequency or severity of colds or other illnesses. If Vitamin C is suddenly withheld after being given in high doses for a long time, withdrawal symptoms can appear.

There is no difference between natural and synthetic vitamins. All vitamins are manufactured whether they are labeled synthetic (made from chemicals) or natural (extracted from plant and animal sources). The human body's use of a vitamin is the same whether it is natural or synthetic.

When purchasing vitamins, price or "name brand" are no assurance of quality. The key to purchasing vitamin supplements is to read the label and to compare them with the RDA. There is rarely a need to exceed the RDA for vitamins.

Prevention of Vitamin Deficiency States

As pointed out before, a balanced, mixed and well prepared diet adequately provides all the necessary vitamins as defined by the RDA. Due to the fact that most of the purchased and prepared foods (e.g., milk, juices, cereals, flour, etc.) are fortified with vitamins, it is safe to assume that the average person receives a generous amount of vitamins above the daily requirement.

However, in a school lunch feeding program, particular emphasis should be paid to the preparation of food because vitamin losses can occur here, (e.g., overcooking, cooking in large amounts of water, or addition of soda to return color). Other causes of deficiencies can be inadequate food intake or inability to obtain certain foods. It has also been shown that a diet high in simple or refined sugars can decrease the production of certain B vitamins, while a diet high in complex carbohydrates (starch and cereal products) can increase the production of certain B vitamins. If, in consultation with the nutritionist and the personal physician, it can be determined that there are inadequate amounts of vitamins in the daily diet, then a supplement is recommended. The supplementation can be given as a liquid, chewable tablets or in capsule form, depending upon the ability of the person to swallow. Chewable Vitamin C tablets are not recommended because of possible damage to the tooth enamel. Guide 3-3 is a list of good food sources of specific vitamins. This guide can be used when planning nutritious, adequate and varied meals.

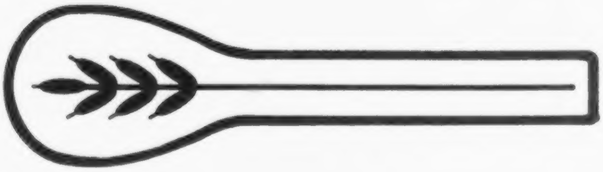
Interaction with Other Drugs

Vitamin absorption or availability is influenced adversely by oil containing laxatives and certain antibiotics. For details see Chapter 17. In addition to the information contained there, it should be mentioned that aspirin in the gut seems to inhibit the uptake of folic acid, a B vitamin.

GUIDE 3-1

TOXIC EFFECTS OF VITAMINS

Vitamin	Toxic Effects
Vitamin A	Fatigue, Paleness, Abdominal Discomfort, Bone or Joint Pain, Severe Headaches, Vomiting.
Vitamin D	Anorexia, Weight Loss, Convulsions, Hypercalcemia (which leads to soft tissue calcification and potentially serious kidney injury).
Vitamin C	Gout, Kidney Stones, Abdominal Cramps, Diarrhea, Decrease of B_{12} absorption.
Niacin	Increased Uric Acid Levels (which precipitate Gouty Arthritis), Peptic Ulcers, Cardiac Arrhythmias, Decrease in B_6 absorption, Cramps, Liver Damage, Increased Blood Glucose, Circulatory Disturbances



GUIDE 3-2

RECOMMENDED DAILY ALLOWANCES (RDA) FOR VITAMINS

						Fat-Soluble Vitamins				Water-Soluble Vitamins						
	Age (years)	Weight (kg)	Weight (lbs)	Height (cm)	Height (in)	VITAMIN A (ug R.E.)	VITAMIN D (ug)	VITAMIN E (mg)	VITAMIN K (mg)	VITAMIN C (mg)	THIAMIN (mg)	RIBOFLAVIN (mg)	NIACIN (mg N.E.)	VITAMIN B_6 (mg)	FOLACIN (ug)	VITAMIN B_{12} (ug)
Infants	0.0-0.5	6	13	60	24	420	10	3	12	35	0.3	0.4	6	0.3	30	0.5
	0.5-1.0	9	20	71	28	400	10	4	10-20	35	0.5	0.6	8	0.6	45	1.5
Children	1-3	13	29	90	35	400	10	5	15-30	45	0.7	0.8	9	0.9	100	2.0
	4-6	20	44	112	44	500	10	6	20-60	45	0.9	1.0	11	1.3	200	2.5
	7-10	28	62	132	52	700	10	7	20-60	45	1.2	1.4	16	1.6	300	3.0
Males	11-14	45	99	157	62	1000	10	8	70-140	50	1.4	1.6	18	1.8	400	3.0
	15-18	66	145	176	69	1000	10	10	70-140	60	1.4	1.7	18	2.0	400	3.0
	19-22	70	154	177	70	1000	7.5	10	70-140	60	1.5	1.7	19	2.2	400	3.0
	23-50	70	154	178	70	1000	5	10	70-140	60	1.4	1.6	18	2.2	400	3.0
	51+	70	154	178	70	1000	5	10	70-140	60	1.2	1.4	16	2.2	400	3.0
Females	11-14	46	101	157	62	800	10	8	70-140	50	1.1	1.3	15	1.8	400	3.0
	15-18	55	120	163	64	800	10	8	70-140	60	1.1	1.3	14	2.0	400	3.0
	19-22	55	120	163	64	800	7.5	8	70-140	60	1.1	1.3	14	2.0	400	3.0
	23-50	55	120	163	64	800	5	8	70-140	60	1.0	1.2	13	2.0	400	3.0
	51+	55	120	163	64	800	5	8	70-140	60	1.0	1.2	13	2.0	400	3.0

GUIDE 3-3

NATURAL FOOD SOURCES FOR VITAMINS

Thiamin (vitamin B_1)

Pork, beans, peas, liver, lamb, veal, nuts, whole grain and enriched breads and cereals, yeast.

Riboflavin (vitamin B_2)

Liver, poultry, milk, beef, veal, lamb, pork, eggs, yeast, beans, cheese, dark green leafy vegetables, whole grain and enriched breads and cereals.

Niacin (vitamin B_3)

Liver, fish, poultry, lamb, veal, beef, pork, peanut butter, beans, peas, yeast, whole grain and enriched breads and cereals.

Pyridoxine (vitamin B_6)

Beef, pork, lamb, veal, liver, kidney, wheat germ, whole grain breads and cereals, soybeans, peanuts, corn, broccoli.

Folacin (folic acid)

Liver, yeast, green leafy vegetables, beans, soybeans, nuts, whole grain breads and cereals.

Vitamin A

Liver, butter, egg yolk, sweet potatoes, spinach, carrots, cantaloupe, squash, dark green vegetables, milk, dairy products.

Vitamin C

Broccoli, strawberries, tomatoes, melon, dark green leafy vegetables, cabbage, liver, potatoes, cantaloupe, parsley, green and red peppers, citrus fruits.

Vitamin D

Fish liver oil, fortified milk, sunlight.

Vitamin E

Salad oils, shortening, margarine, green leafy vegetables, wheat germ oil.

Vitamin K

Green leafy vegetables, egg yolk, soybean oil, liver. After the newborn period, humans are able to produce it themselves.

GUIDE 3-4

SIGNS OF VITAMIN DEFICIENCY STATES

Vitamins	Signs of Possible Deficiency State
A	Night blindness, drying and wrinkling of the cornea. Dry scaly skin, slowing of mental and physical growth, urinary problems
B-group divided by vitamin functions, either:	Failure of release of energy from food resulting in apathy, weakness, anorexia, failure to gain weight, nerve symptoms, including paralysis, heart failure, skin changes, chronic diarrhea
or:	Failure to mature red blood cells resulting in anemia
or:	A combination of both
C	Swollen bleeding gums, swelling of the bone-cartilage junction of the ribs, skin hemorrhages, blood in urine, swollen joints
D	Outside of infancy, swelling of the bone-cartilage junction of the ribs and joints, bending of bones, loss of muscle tone, bowel changes
E	Aside from forms of anemia in premature infants and some neurological abnormalities in older children with malformation of the bile ducts no deficiency state has been observed due to the wide spread distribution of the vitamins
K	Bleeding tendency, e.g., skin bleedings, blood in urine and bowels, secondarily resulting in anemia

Fluids and Minerals

4

FLUIDS AND MINERALS

Body fluids are the vehicle by which nutrients and oxygen carrying cells are transported to body tissues, and by which waste products are returned and finally excreted. Minerals are essential to build and to maintain bones, teeth, and hemoglobin. In addition, minerals have numerous life maintaining tissue functions. Refer to Guide 4-1 for a detailed outline of the minerals, their food sources and functions in the body.

Fluids in Nutrition

There is generally an adequate amount of fluid included in a mixed and appropriate diet. While this fluid may have different forms (e.g., milk, juice, beverages, soup, or be contained in fruits and vegetables) it can generally be expressed in terms of water. Water is the ingredient of most liquids and is involved inside the human body as an almost universal solvent, as a means of transportation, and as part of all the chemical reactions of digestion and utilization of food.

Dramatic shifts in body weight can signal a problem with the water balance and should be monitored. Fluid losses may be high due to chronic diarrhea, malabsorption, vomiting, or certain medications. In all instances, the replacement of lost fluids is necessary. Fluids are also essential for treatment of constipation along with the high fiber diet. Another problem for the developmentally disabled is a dry mouth, often associated with medications especially anticonvulsants. The developmentally disabled child may not associate the thirst drive with the satisfaction felt after drinking fluids, and therefore would not ask for a drink. Liquids should be offered frequently throughout the day, using the consistency best tolerated by the individual. An over-sensitive gag reflex, choking, drooling, or spillage can make it difficult to drink large quantities of fluid at any one time.

While withholding oxygen leads to death within minutes, the lack of any fluid intake will lead to the loss of life in days. The regulation of the fluid balance in the body is one of the many tasks of the kidneys. An excess of fluids in the diet results in an increase of urine production. An insufficient supply of fluids produces a decrease of urine and finally, a life threatening lack of body water fluids (for more information on dehydration, see Chapter 12). To a lesser degree the lungs and the skin also influence the water balance.

Fluid Requirements

The amount of fluids necessary to maintain normal body functioning is dependent on age and size. Small infants need a much higher water intake per unit body weight than adults do.

A good estimate of appropriate fluid intake can be obtained in an otherwise healthy person by measuring the urine. If fluid intake is an area of concern with the developmentally disabled person, the nurse, school classroom teacher, or parent may monitor the urinary output. In adults the daily amount of urine should be between 1000 and 1500 ml (about 1 to 1½ quarts). If a child urinates every 3-4 hours, it generally indicates a good water balance. One should, however, be cautioned that the presence of a disease (especially diabetes and kidney diseases) make these general observations unreliable. Any person having a water imbalance may be seriously ill and medical advice ought to be sought as soon as possible. A summary of the fluid requirements can be found on Guide 4-2.

Major Minerals

Most minerals are abundant in the normal diet and deficiencies for lack of intake are extremely rare. On the other hand, an oversupply of minerals can cause problems. Most commonly involved is sodium chloride (the common cooking salt). The American diet tends to contain too much of it, especially in the so-called fast foods, which then can result in high blood pressure. Hypertension (high blood pressure) due to high salt intake can occur in young persons as early as 15 years old.

Disturbances of the minerals (electrolytes) in body fluids are observed frequently in persons who are ill with any of a large number of diseases. Most frequent causes of such imbalance are diarrhea (loose stools), vomiting, kidney disease, and diabetes. In most of these instances, medical attention should be sought. Refer to Guide 4-3 for the RDA listings of minerals. As with vitamins, there is no need for most persons eating a regular diet to take a mineral supplement. The presently recommended amount of salt (sodium chloride) is 5 gm (2 gm sodium) per day, which is about one regular teaspoon.

Trace Minerals

Many other minerals are necessary for good nutrition, but under normal conditions are needed only in small amounts (trace). Again, a good mixed diet provides an ample supply even for the developmentally disabled child. However, if a person is on a restricted diet, out of medical necessity or by choice or has, due to a medical condition, an increased need for any of these trace minerals then there might be a need for supplementation. An oversupply of some minerals may be harmful and can disrupt the entire mineral and fluid balance in the body.

The following minerals are of special concern to the developmentally disabled: iron, fluoride, copper, and lead. Iron is basically contained in meat products (especially liver) but not in milk. Children, when drinking milk excessively can run low of this mineral in time of greatest need. Also, persons with continuous blood loss or a long, drawn out disease have increased needs for this mineral in their diet. If this is not supplied, they may become anemic as a consequence. Further studies have suggested that learning performance and concentration ability were low in iron-deficient handicapped children. When this is corrected, the pattern of attentiveness and learning usually improves.

Fluoride deficiency can be a problem especially during bone and tooth development. The American Dental Association suggests that persons living in areas with non-fluoridated or low fluoridated water should be given fluoride supplements. Fluoride supplements should be chewed or sucked before swallowing by children who can do so. The dose of the prescribed fluoride supplement varies according to a child's age and the level of natural fluoridation. Parents, teachers, and food service staff can find out local water fluoride levels by contacting the local water department. Well water can be tested by a private or the

State Health Laboratory. Fluoride-vitamin combinations are widely used for small children and are effective in preventing cavities. There is no evidence however that the presence of vitamins enhances the action of fluoride. For more information see Chapter 16.

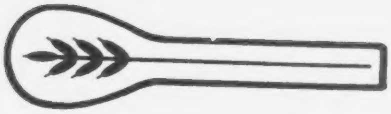
Copper can be a mineral of concern to handicapped children, especially if they are not getting adequate amounts of protein in the diet. Underweight and small-for-age children are also at risk for copper deficiency. Anemia is the most obvious effect of a copper deficiency.

Lead is of particular importance in developmental disabilities. When large amounts of lead are inadvertently ingested from such items as lead-containing house paint chips or food contaminated through lead-glazed dishes, toxic levels then can cause anemia, nerve damage, mental retardation and behavioral problems in children. Many trace elements are toxic when taken in amounts greater than optimal intakes. Some, such as lead, are slowly eliminated by the body and therefore, accumulate gradually to dangerous levels.

Prevention of Water and Mineral Disturbances

It cannot be overemphasized that a mixed, properly prepared, and plentiful diet with sufficient fluid intake is the best assurance for avoidance of any problems caused by fluid and mineral disturbances.

If disturbances are suspected or observed, they may be the sign of a serious health problem and medical advice regarding diagnosis and treatment ought to be sought speedily. Long-term use of some medications for the developmentally disabled may cause deficiencies of some minerals. These are addressed in Chapter 17.



GUIDE 4-1

SOURCES AND FUNCTIONS OF SELECTED MINERALS

Sources	Functions
Calcium	
Milk, greens (turnips, collards), kale, mustard, ice cream, hard cheese, broccoli, sardines, oysters, shrimp, salmon, clams, cabbage, dried peas, beans	Aids in development of bones and teeth Maintains healthy nerves and muscle activity Aids in clotting of blood
Phosphorus	
Meat, especially organ meats, fish, poultry, eggs, cheese, milk, nuts, legumes, whole grain breads and cereals	Strengthens bones and teeth Acts as buffer substance in acid-base balance Activates oxidation of carbohydrates Promotes emulsification and transport of fat
Magnesium	
Whole grains, nuts, beans, green leafy vegetables	Aids in development of bones and teeth Activates enzymes needed to release energy Regulates body temperature, nerve and muscle contraction, and synthesis of protein
Sodium	
Salt, monosodium glutamate, soy sauce, baking powder, cheese, milk shellfish	Regulates water and acid-base balances
Potassium	
Meats, milk, dried dates, bananas, cantaloupe, apricots, citrus fruits, tomato juice, dark green leafy vegetables	Aids in formation of muscle tissue Helps maintain water balance Activates enzyme reaction
Iron	
Liver, organ meats, lean meats, egg yolk, green leafy vegetables, Whole grain and enriched cereals and breads, beans, nuts, molasses, dried peas, dried fruits (peaches, apricots, prunes, grapes, raisins)	Helps in the production of hemoglobin, which carries oxygen from the lungs to the body cells

Iodine	
Iodized salt, marine fish, shellfish, dried seaweed, cod liver oil	Helps in the production of thyroid hormones
Zinc	
Whole grain cereals and breads, beans dried peas, nuts, muscle meats, fish, poultry, eggs, lean meats	Helps in the production of insulin Activates enzymes important in transport of carbon dioxide in the blood, enzymes that digest protein and enzymes essential in bone metabolism
Fluorine	
Fluoridated water and toothpastes	Strengthens the teeth and prevents dental caries
Copper	
Organ meats, shellfish, dried peas, and beans, nuts	Essential for production of hemoglobin and other body enzyme functions

GUIDE 4-2

RANGE OF AVERAGE FLUID REQUIREMENTS UNDER ORDINARY CIRCUMSTANCES

Age	Wt. in kg	Total Water in 24 hours (ml)	Approximate Serving Equivalent
Infant	3.0- 5.0 kg	400-500	2 cups (1 pt.)
3-9 months	5.5- 8.5 kg	750-1250	3 to 5 cups
1-4 years	9.5-16.5 kg	1150-1800	4 1/2 to 7 1/2 cups
4-10 years	16.5-32.5 kg	1600-2500	6 1/2 to 10 cups
10-18 years	32.5-60.0 kg	2000-2700	8 to 11 cups
Adult	70.0 kg +	2800-4200	11 1/2 to 17 cups

GUIDE 4-3

RECOMMENDED DAILY ALLOWANCES (RDA) FOR MINERALS

Mineral	Units of Measurement	Infants 0-6 months	Infants 6-12 months	Children 1-4 years	Children 4-10 years	Adolescents and Adults Male	Adolescents and Adults Female
Calcium	milligram	360	540	800	800	400	400
Phosphorus	milligram	240	360	800	800	1200-800	1200-800
Magnesium	milligram	50	70	150-200	250	350-400	300
Iron	milligram	10	15	15-10	10	18-10	18-10
Zinc	milligram	3	5	10	10	15	15
Iodine	microgram	40	50	70	90-120	150	150

Guides 4-2 and 4-3: Modified after Behrman, R.E., and Vaughan, V.C. III. Nelson Textbook of Pediatrics, 13 Edition, W.B. Saunders Co., Phildelphia, PA, 1983.

Nutritional Care of Slow Growing and Underweight Children

5

NUTRITIONAL CARE OF SLOW GROWING AND UNDERWEIGHT CHILDREN

Slow growth and underweight are common among children with developmental disabilities. For some, this may be a result of an inherited reduced potential for growth, and therefore, cannot be influenced by nutrition alone. For some nonambulatory children maintaining a relatively low weight may be necessary to facilitate physical care. In most cases, however, the goal of nutritional care is to promote growth and to achieve appropriate weight gains.

Sometimes developmentally disabled children will be underweight even when food intake seems to be adequate. Conditions which might prevent proper weight gain in spite of a good food intake include inability to absorb nutrients, excessive activity, poor dental health, frequent vomiting, hyperactivity, inability to chew, severe diarrhea, or an inherited growth failure. The first step in achieving weight gain in some of these children will be to recognize and treat the underlying condition.

All handicapped children should be weighed at least monthly. One may monitor this weight more closely by using a chart or graph (see Chapter 6 and Guide 6-1). Those who are severely handicapped or on special dietary regimens should be weighed weekly. Length or height may also be measured monthly for very young children or those who need to be closely monitored. The classroom teacher may assume that responsibility. For others, height and weight measurements every three to six months may be adequate.

Growth and development proceed in an orderly and predictable pattern in the normal child. Growth charts have been developed and should be used (at home, school, and doctor's office) as a measure of physical growth (see Guide 1-6). There are no growth charts for handicapped children except for Down syndrome (see Guide 1-4). Infants normally increase their length by 50% the first year, double it by age four, and triple it by 13 years of age. By four months of age, most infants have doubled their birth weight and tripled it by 12 months. Thereafter, the yearly increments in weight proceed at a slower but constant rate averaging five pounds per year until the ninth or tenth year.

Determining Basic Calorie and Protein Amounts

Height is a valuable measurement when determining how many calories a child needs. A guide based on height that can be used with children is:

age one to three years	14 calories/cm	35 calories/inch
age four to six years	15 calories/cm	38 calories/inch
age seven to ten years	18 calories/cm	45 calories/inch.

A suggested guide for an underweight infant based on weight is 550 calories per pound of body weight.

The protein requirements for a child are:

up to one year	2.2-2.5 gm/kg protein	4.5-5.5 grams/pound
one year to seven years	1.5-2.2 gm/kg protein	4 grams/pound.

The procedure would be to weigh the child (and convert to kilograms), then multiply by the number of grams of protein required for the age group. These common protein foods contain an average of seven grams of protein per ounce:

meat
cheese
poultry
fish
yogurt (8 oz.)
egg (1 medium)
beans (1/2 cup)
milk (8 oz. glass)
peanut butter (2 tablespoons)

(when increasing protein, increase the portion size accordingly).

A classroom teacher may provide the weight information to the school lunch personnel and parents to better assist them in menu planning. Parents and teachers should be encouraged to read food labels in order to determine the protein content. Most commercial baby food and infant formula products have nutrition labeling, so it is easy to add up the total calories and total protein a child is getting daily.

Supplying Additional Calories and Protein

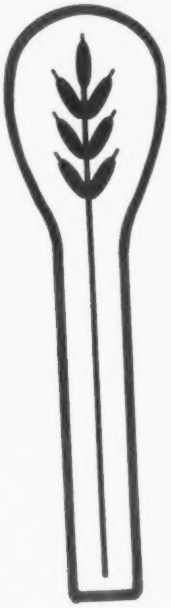
Protein is an important nutrient in feeding underweight children. However, several protein foods are difficult to eat. For small developmentally delayed children who lack the ability to chew, whole milk or infant formulas may be used. Commercially prepared baby foods with meat are easier to eat. The consistency of all meat-containing baby foods is much thicker and may not be acceptable to the child, but they can be mixed with a vegetable or mashed potatoes. Well-cooked meat may be put in the blender with gravy or broth. Casseroles with meat blend very well especially with added broth or gravy. Added powdered skim milk or a jar of baby food meat to a hot dish increases the protein content. Eggs may be cooked into puddings or cereals if they are unacceptable by themselves. Melted cheese can be added to mashed potatoes or hot dishes. Yogurt may be blended to pureed fruits for a fruit pudding together with honey or sugar.

If the child needs more calories, one should add foods not only high in calories, but of high nutrient value. Infant formula products or nutritional supplements are available from most grocery stores or can be ordered through a pharmacist. These are well-balanced products that offer not only calories but sound nutrition.

Unsaturated fats (soft margarines or oils) may be added to vegetables, cereals or cooked starch products. Unsaturated fats are easier to digest and do not contribute to other health problems. Unsaturated fats come from plant sources (vegetable and grains) and are usually liquid or soft solid. Whole milk is a good source of fat because it contains essential fatty acids and contributes vitamins and minerals, except iron, necessary for growth.

Sugar and honey are high calorie sweeteners that may be added to cereals, pureed fruits, or fruit drinks. However, it should be remembered that these offer calories only and should always be used in combination with other foods and when additional calories are needed.

Young children often drink better than they eat. Therefore nutritious, high calorie beverages are recommended. Ice cream can be blended with whole milk and any fresh or frozen fruit for a smooth fruit milk shake. Many grocery stores carry a wide variety of fruit juices and nectars (e.g. grape, cherry, prune, apple, orange juice and peach, pear and apricot nectar). One may have to look hard to find them or ask the grocer to stock them. These are sources of the same nutrients found in the fruits they originate from. However, they are much easier to feed and to digest. If the flavor is too tart or they are refused, they can be made attractive by adding milk or ice cream to make a type of fruit milk shake. Some children like them diluted with regular car-bonated soft drinks without caffeine (e.g., ginger ale and lemon-lime flavored beverages), but again one has to remember that this is adding only calories. Heavily sweetened fruit drinks should not be offered. Words like "100% fruit juice" or "fruit nectar" on the label should be looked for. They will be more expensive but offer nutritional support. Beverages should be served at the end of the meal so as not to fill the child before the meal is eaten. Guides 5-1, 5-2, 5-3, and 5-4 present practical suggestions for weight gain.



GUIDE 5-1

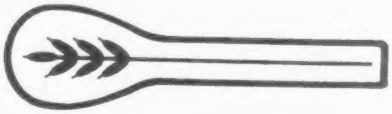
SNACK SUGGESTIONS
to increase calorie content of the diet

fruit flavored or plain yogurt
fruit juice
ice cream
sherbet
gelatin with fruit juice used as liquid
dried foods
whole milk
cheese
oatmeal cookies
graham crackers
whole wheat snack crackers
cereal with milk
soft granola bar or cookies
sandwiches (whole wheat bread)
quick breads (banana,zucchini, date, etc.)
bars (zucchini, carrot, pumpkin, etc.)
milkshakes (with added powdered milk and fruit)
hard cooked eggs
toast with peanut butter

(Avoid candy, cake, pop and other empty calorie foods)

Sweets decrease the appetite. When served, sweets should be with the meal, not alone.

It is suggested that two to three snacks be given daily for weight gain along with the three regular meals. Space snacks appropriately between meals not to interfere with regular mealtimes.



GUIDE 5-2

PRACTICAL SUPPLEMENTS THAT CAN BE ADDED DURING FOOD PREPARATION

Food	Calories	Suggested Use
Cheese (spread, sliced, cubed, or shredded) (Cheddar, American)	120 Cals/oz.	by itself with crackers, sandwiches, toast, casseroles, English muffins, vegetables, gravies, sauces, soups, beverages
Eggs (fresh, frozen, powered)	fresh-81 cals/1 med. egg powdered-592 cals/1 c.	baked goods, meat loaf, meat balls, rice dishes, soups
Evaporated milk	137 cals/1/2 c.	beverages, soups, cooked cereals, puddings
Nonfat powdered dry milk	25 cals/tbsp.	beverages, soups, cooked cereals, baked goods, mashed potatoes, puddings, cream sauces
Peanut Butter	87 cals/tbsp.	with crackers or bread, baked goods, frostings
Vegetable Margarine	101 cals/tbsp.	soups, casseroles, vegetables, gravies, cooked cereals, breads, crakers
Vegetable Oil	110 cals/tbsp.	soups, casseroles, vegetables, gravies, cooked cereals
Baby Food Meats	100-150 cal/jar 14 gms protein/jar	mix with cream soups, thin mashed potatoes, stir into a casserole

Remember: If a child is underweight, but grows constantly with adequate nutrition and supplementation, and increases weight, this may be considered normal.

GUIDE 5-3

RECIPES TO ADD EXTRA CALORIES

HIGH PROTEIN RAISIN PUDDING

1 cup quick barley
1 tsp. salt
3 cups boiling water
2 cups 2% cottage cheese
3 eggs, beaten
1 cup raisins or chopped peaches
1/2 cup brown sugar
1-1/2 tsp. cinnamon
1/2 tsp. nutmeg
1/2 cup shredded coconut
3 tbsp. butter or margarine

Stir barley into salted boiling water. Cover; simmer 10 to 12 minutes or until tender, stirring occasionally. Drain; cool. Add remaining ingredients except coconut and butter; pour into greased 8-inch square baking dish. Sprinkle with coconut; drizzle with butter. Bake at 350° F. for 45 minutes. Cut into squares; serve warm (with ice cream or cream--optional). Serves 8.

INSTANT BREAKFAST DRINK MALT

1 pk. any flavor instant Break. powder
1/2 c. ice cream
1/2 c. milk

Blend in blender to make a fortified malt. May be made in large quantities and frozen in individual glasses. Thaw slightly before use.

RAISIN MUMBLES

(Filling)
2-1/2 cups raisins
1/2 cup sugar
2 tbsp. cornstarch
3/4 cup water
3 tbsp. lemon juice

Stir ingredients over low heat until thickened, about 5 minutes. Let cool.

(Crumb mixture)
3/4 cup margarine or butter
1 cup brown sugar (well packed)
1-3/4 cups sifted flour
1/2 tsp. salt
1/2 tsp. soda
1-1/2 cups rolled oats

Mix margarine or butter with sugar, add dry ingredients, then oats. Press half of the mixture into a greased 13x9x2 pan. Spread on filling, then pat on remaining crumbs. Bake at 400°F for 20-30 minutes. Cut in bars.

STRAWBERRY BANANA SHAKE
(Makes about 6 cups)

1-1/2 cups fresh strawberries, cleaned and hulled or 1 cup frozen unsweetened strawberries, partially thawed
1/2 cup sliced banana
1/3 cup reconstituted lemon juice
1 cup cold water
1 (14 oz.) can sweetened condensed milk (NOT evaporated milk)
2 cups ice cubes

In blender container, combine all ingredients except ice; blend well. Gradually add ice, blending until smooth. Garnish as desired. Refrigerate leftovers.

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Sweetened condensed milk, when blended with fruit, ice and reconstituted lemon juice, makes rich, creamy milk shakes. Terrific as an energizing snack that stays thick in the refrigerator.

****

QUICK CHOCOLATE PUDDING

1 c. ready to use vanilla pudding (canned)
1 pkg. Choc. Instant Breakfast
1/4 c. milk

Blend Instant Breakfast and milk in blender. Add to pudding. Makes 2 servings fortified choc. pudding.

CREAMY BANANA PUDDING
(Makes 8 to 10 servings)

1 (14 oz.) can sweetened condensed milk (NOT evaporated milk)
1-1/2 cups cold water
1 (3-1/2 oz.) package instant vanilla pudding and pie filling mix
2 cups (1 pint) whipping cream, whipped
36 vanilla wafers
3 medium bananas, sliced and dipped in lemon juice

In large mixing bowl, combine sweetened condensed milk and water. Add pudding mix; beat until well blended. Chill 5 minutes. Fold in whipped cream. Spoon 1 cup pudding mixture into 2-1/2 quart round glass serving bowl. Top with one-third each of the vanilla wafers, bananas and pudding. Repeat layering twice, ending with pudding mixture. Chill thoroughly. Garnish as desired. Refrigerate leftovers.

TIP: Mixture can be layered in individual serving dishes.

GUIDE 5-4

SUGGESTIONS FOR INCREASING PROTEIN, CALORIE AND NUTRIENT INTAKE

Milk and Milk Products

Add powdered skim milk to regular whole milk (1 qt. milk with 1 c. powdered milk) or use half and half, evaporated milk, or sweetened condensed milk instead of milk or water whenever possible in recipes for pudding, cocoa, milk shakes, cream soup, custard, or eggnog.

Add powdered milk to yogurt, casseroles, bread, muffins, sauces, gravies, soups and mashed potatoes.

Add cheese to sandwiches, meats, potatoes, salads, vegetables, rice, pasta, and cream sauces.

Offer cottage cheese or other cheeses on crackers; add cheeses to vegetable dishes and pasta (cream cheese is not considered a high calcium/high protein milk product).

Add plain or flavored yogurt to ice cream, mix with granola, use in beverages such as shakes or in whole-grain cookies.

Make instant breakfast with milk or purchase ready-made high calcium protein beverages.

Yogurt may be added to fruit or desserts, and used to top cereal, pancakes, or waffles.

Protein Group

Add small pieces of cooked meat, fish, poultry, or eggs to salads, casseroles, soup, vegetables, omelets, and noodles.

Eggs may be added to French toast or pancake batter, custards, pudding, deviled sandwich spreads, cheesecake, or sponge cake.

Peanut butter can be used with all grains, spread on fruit or vegetables, blended in milk drinks, ice cream, or yogurt.

Add nuts to salads, ice cream, vegetables, fruits, entree dishes and sandwiches.

Textured vegetable protein, tofu or legumes, can be cooked and made into casseroles, soups, cheese or milk dishes.

Offer simple fried foods such as chicken or fish.

Serve meat with extra gravy or sauce when appropriate.

Fruits and Vegetables

Add mashed fruit to milk, yogurt, shakes, ice cream, or pudding.

Make gelatin desserts with 100% fruit or vegetable juice instead of water.

Add a bit less water when reconstituting frozen juices.

Add honey to fruit in juice or vegetables.

Add dried fruits to muffins, cookies, cereal, and grains or combine with vegetables, nuts, or grains.

Serve vegetables raw with a dip or creamed style using extra milk or cheese.

Add small amounts of butter, margarine, sour cream, or mayonnaise to vegetables.

Grains

Make hot cereals, especially oatmeal and bran cereals using milk or juice instead of water and adding nuts to them.

Use high-protein noodles and grains in casseroles and soups.

Bread or flour meat before cooking.

Offer whole-grain desserts such as oatmeal, raisin-bran, or peanut-butter cookies.

Top muffins, toast, crackers, pancakes with margarine, cream cheese, syrup, jam, peanut butter, cheese, or honey.

Adapted from Manual of Pediatric Nutrition by W. Allan Walker, M.D., and Kristy M. Hendricks, R.D., M.S. 1985

67

Management of the Overweight Person

6

MANAGEMENT OF THE OVERWEIGHT PERSON

Obesity, like undernutrition, is a form of malnutrition. Developmentally disabled persons especially those with Down syndrome, spina bifida (myelomeningocele), and Prader-Willi syndrome often have problems with overweight (10-19% over average weight standards) or obesity (20% over average weight standards). Many times lack of mobility and inability to exercise increase the problems of overweight or obesity. The problem can exist throughout life. It has been shown that approximately 80 percent of all overweight children remain overweight throughout life.

Most diets for weight reduction are based upon the recommended amount of calories per centimeter or inch of height. After a complete nutritional assessment, including energy input and output analysis, a caloric determination is made by the physician and registered dietitian. Parents and teachers should become knowledgable about the diet and the adherence to it.

Overweight and obesity can usually be prevented. Parents and teachers should be aware of indicators that frequently are associated with overweight or obesity problems:

1. overweight or obese parents
2. family history of heart disease or diabetes
3. plump and "chubby" (overweight) infants.

Practical Interventions

Prevention is the best recommendation to avoid overweight. Parents, friends, and teachers have a tendency to use food as a reward or as a sign of sympathy for the developmentally disabled child or adult. Both should be avoided. Parents and teachers should encourage and support the children in order to prevent overweight or obesity. Classroom snacks should be low in calories and concentrated sugars.

An individual diet should always be planned for an overweight or obese child. Parents and teachers may want to work with a psychologist and registered dietitian to include a behavior modification program along with ongoing nutrition counseling.

Children on a weight loss program should be weighed weekly by the same person. Their weight should be recorded on a chart (see Guide 6-1). For an adult, one to two pounds weight loss per week is optimal. It is important to point out that this is the ideal recommendation for safe and healthy weight loss. For a developmentally disabled person, or a child, one to two pounds weight loss per week may be too high. Progress may be slower, but should be consistent and highly reinforced by weekly weigh-in times.

Parents, teachers, and school food service personnel can use the following techniques to help in weight reduction:

1. serve smaller portions
2. dish out from stove, (avoid putting food in front of a person)
3. encourage slow eating (45 minutes to one hour per meal)
4. increase fruits and vegetables in the diet
5. avoid fatty foods, (e.g., fried foods, gravies, oils, salad dressings, butter, and margarine)
6. avoid concentrated sweets (e.g., candy, pop, ice cream)

7. use skim or 1% milk and milk products for older children and adults; never use 2%, 1% or skim milk with a child under one year
8. dilute beverages containing sugar with water
9. increase exercise to 15-20 minutes per day
10. include good snacks (e.g., fresh fruit or vegetables, canned fruits in water or rinse those packed in syrup with water, unbuttered popcorn, frozen fruit pops, low fat yogurt, vanilla wafers, skim milk, unfrosted angel food cake, all in limited amounts.)
11. 1200 calorie diet (see Guide 6-2)

The key to all of this is a healthy and diversified diet. When trying to lose weight, total food avoidance or quick weight loss programs are never recommended. These regimes may do more harm than good. Weight loss is a team effort. For the developmentally disabled person, the support of teachers, family and friends must be ongoing. For certain developmental disabilities a slightly overweight body structure may be normal. Ongoing work with the registered dietitian, physician and family is the key to maintaining an average and acceptable body weight (for low calorie recipes see Guide 6-3).

Along with the right food choices for weight control, exercise should be a regular routine. If aerobic exercise is not possible, walking, bowling or simple floor exercises are recommended. A physical therapist can work closely with parents and teachers to plan the appropriate exercise schedule. In the school setting, the teacher should use recess for physical exercise. Further, teachers and parents should watch for overeating and discourage it, and advise against bringing food or snacks to school.

GUIDE 6-1

WEIGHT-LOSS PROGRESS

NAME ________________________________

DATE														
WEIGHT														
GOAL														

WEIGHT-LOSS PROGRESS

NAME ________________________________

DATE														
WEIGHT														
GOAL														

GUIDE 6-2

BASIC 1200 CALORIE SAMPLE DIET

Breakfast:
1 - 4 oz. glass real fruit juice
or
1 small piece of fruit

1 slice whole wheat toast with
1 tsp. butter or margarine

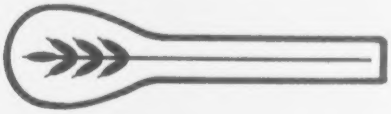
1 8 oz. glass milk (2%)

Lunch:
2 oz. meat, cheese, or protein equivalent
2 slices whole wheat bread
1 small piece fresh fruit
1/2 cup non-starchy vegetable
1 8 oz. glass milk (2%)

Dinner:
2 oz. meat or cheese or protein equivalent
1/2 cup mashed potatoes, 1/2 tsp. butter or margarine
1 small dinner roll with 1/2 tsp. butter or margarine
1 small piece fresh fruit
1/2 cup non-starchy vegetable
1 8 oz. glass milk (2%)

Be sure to measure and weigh out appropriate measures.

This diet sample can provide the requirements for the Recommended Dietary Allowances if fruits and vegetables are served. Diets should include a variety of foods that are interchanged throughout the menu plan. Menu planning should fit the lifestyle of each individual.



GUIDE 6-3
NUTRITIOUS LOW CALORIE SNACKS

JULIUS SHAKE

2 servings - 60 calories each

1/2 c. milk
1/2 c. cold water
1 t. vanilla
3 ice cubes
1 c. frozen or fresh unsweetened whole strawberries
Low calorie sweetener to taste

Blend in blender until milk shake consistency.

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TANGERINE ORANGE GEL

5 servings - 45 calories each

1 T. granulated gelatin
1/2 c. cold water
1/2 c. boiling water
Sugar substitute to replace 1 T. sugar
1 c. fresh orange juice
1 t. fresh lemon juice
2 med. size tangerines

Soak gelatin in cold water. Add boiling water and sugar substitute; stir until gelatin is dissolved. Add orange and lemon juices; mix well. Cover and chill in refrigerator until mixture gels to consistency of unbeaten egg white. Meanwhile, peel and segment tangerines, removing white membrane. Cut segments into halves or thirds and measure 1 cup. When gel is partially set, gently fold in fruit. Turn into dessert serving bowl or 5 individual 1/2 cup dessert dishes. Cover and chill in refrigerator 2 to 3 hours until gelatin is set.

ORANGE BISCUITS

12 servings - 121 calories each

2 c. sifted flour
4 t. baking powder
1 t. sugar
1/2 t. salt
1 T. grated orange peel
5 T. butter or margarine
3/4 c. fresh orange juice

Preheat oven to 425°F. Sift together dry ingredients. Cut in orange peel and butter with pastry blender or fork until mixture resembles coarse meal. Add orange juice. Mix gently to form a ball. Knead on lightly floured surface 10 times. Pat or roll to 1/2-inch thickness. Cut with floured, round 2 1/2-inch cutter. Bake on baking sheet until light brown, 12 to 14 minutes.

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PETER'S FAVORITE STRAWBERRIES

4 servings - 62 calories each

1 pint ripe strawberries
1 medium (200 gms) orange
2 T. fresh orange juice
Artificial sweetener to substitute for 3 t. sugar (optional)

Wash and hull strawberries; cut each in half. Slice ends off orange; quarter orange lengthwise and slice orange wedges crosswise with peel left on, as thin as possible. Put strawberries and oranges in a bowl; mix well. Drizzle the orange juice over the fruit; stir to mix. Check to see if berries have enough natural sweetness for your taste; if not, add artificial sweetener. Cover bowl and chill in refrigerator 2 hours before serving; stir gently several times to blend flavors.

Recommendations for Persons Needing Diets for Special Medical Conditions

7

RECOMMENDATIONS FOR PERSONS NEEDING DIETS FOR SPECIAL MEDICAL CONDITIONS

This section will address the major developmental disabilities that may require nutritional intervention. The following is a summary of the major disorders to be discussed:

Developmental Disability	Nutrition-Related Problems
Cerebral Palsy	Growth retardation, inability to feed, swallowing problems, possible nutrient interaction, possible nutrient deficiencies
Down Syndrome	Growth retardation (short stature), obesity, possible drug-nutrient interactions
Mental Retardaton	Growth retardation, inability to feed, swallowing problems, food intolerances, obesity, possible drug-nutrient interaction
Epilepsy	Inability to feed, lack of appetite, possible drug-nutrient interaction
Cleft Lip and Palate	Inability to eat
Visual Impairment	Inability to feed
Phenylketonuria (PKU)	Inability to digest certain proteins
Learning Disabilities	Food sensitivities
Hyperactivity	Food sensitivities, possible drug-nutrient interactions
Spina Bifida (Myelomeningocele)	Obesity
Prader-Willi Syndrome	Obesity
Autism	Possible drug-nutrient interactions (e.g., phenothiazines and fenfluramine)
Allergies and Food Sensitivities	Inability to tolerate certain foodstuffs possibly resulting in nutritional deficiency (e.g., vitamins)

There may also be other special medical conditions, in which a therapeutic diet may be needed. A physician and registered dietitian should always be contacted if there are questions or problems with a diet.

The nutrition-related problems are best dealt with when there is understanding and cooperation between the school food service personnel, teachers, parents, and the physician. It is desirable that every child have an attractive and nutritious meal if possible. Each brief section that follows will review the developmental disability and provide suggestions for dealing with the nutrition-related problems (for drug-nutrient interaction information refer also to Chapter 17).

Cerebral Palsy (CP)

Cerebral palsy is a disorder of muscle control or coordination resulting from injury to the brain during its early (fetal, perinatal, and early childhood) stages of development. "Cerebral" refers to the brain, and "palsy" means paralysis or the inability to move or control one or more parts of the body. There are no specific nutritional guidelines for a cerebral-palsied person.

However, there is some evidence that the following nutrient deficiencies may occur with CP: magnesium, pyridoxine (a B-vitamin), folic acid (for those on anticonvulsive therapy), protein bound calcium, iron, and ascorbic acid. Copper and zinc may be found in elevated levels in some persons with CP. Underweight and obesity continue to be the major problems. The spastic CP, because of limited activity, usually requires a lower caloric intake, while the athetoid (because of his increased involuntary movements) requires far more calories to maintain desirable body weight. Caloric intake may vary from 1200 to 6000 calories--or more for an athetoid adolescent.

Feeding problems such as tongue thrust, absent sucking and swallowing reflexes, delayed chewing reflex, delayed hand-to-mouth movement, and inability to self feed may be present in persons with cerebral palsy. For a detailed discussion of these problems refer to Chapter 13.

Since determining the appropriate caloric intake is essential, the following guidelines are given:

Children 5-11 years old (Mild to moderate involvement) with minimal restriction of activity level)	13.9 cal/cm	(35.3 cal/in)
Children 5-11 (Severe involvement where mobility is restricted considerably)	11.1 cal/cm	(28.2 cal/in)

It is important that parents and teachers carefully monitor the actual intake, especially protein, of the person with CP and include observation of the food spillage on the tray, bib, floor, table, etc. To deal with the possible nutrient deficiencies, a multi-vitamin daily supplement may be necessary. If constipation is a problem, especially because of lack of activity, refer to Chapter 12.

Since drooling can be a problem for some persons with CP, it has been recommended to use oily liquids to reduce saliva because milk and sweet and sour liquids may stimulate mucus and saliva secretion. If drooling becomes a serious problem, surgery can be performed which drains saliva from the front of the mouth to the tonsilar area.

Down Syndrome

Down syndrome is a genetic disorder. The severity of the disorder varies in that some children are more affected than others. This syndrome is the most common genetic disorder, occurring in about one of 800 live births. The incidence seems to increase with advanced parental age at the time of conception.

The short stature, obesity, abnormalities in the mouth and tongue (including a tongue thrust), and poorly formed teeth may contribute to poor nutrition and growth retardation. The dietary recommendations for a person with Down syndrome are usually very specific. It is important that parents work closely with the registered dietitian, physician, and dentist in planning and providing a nutritionally sound diet.

If obesity is a problem, teachers and parents should encourage daily exercise for 15-20 minutes. A low calorie diet can be planned with the assistance of a registered dietitian. Concentrated sweets such as candy and pop should be limited, as they provide "empty" calories. Teachers and parents should monitor height and weight progress.

Possible nutrient deficiencies may include Vitamin A and Vitamin B_6. If a lack of these vitamins is diagnosed, they may be prescribed. Megavitamin therapy (treatment of doses far above the RDA) is not recommended and may be harmful. Parents should report any health problems as soon as possible to their physician.

For some Down syndrome children, poor growth along with short stature is a problem. For these children, a high caloric diet with an individually prescribed vitamin or mineral supplementation may be necessary. Small frequent meals are recommended using high quality protein such as meat, cheese, eggs, and peanut butter along with breads and fat-rich food such as butter, margarine, salad dressing, mayonnaise, gravy, and whole milk. Fat-rich foods contain over twice as many calories per unit weight as protein and carbohydrate (e.g., bread, potatoes, cereal, etc.) sources.

Mental Retardation

Mental retardation refers to significantly subaverage general intellectual functioning that usually exists with problems in adaptive behavior. Mental retardation can exist by itself or it can be associated with other developmental disabilities such as cerebral palsy, Down syndrome, epilepsy, and many others.

Generally, the major nutritional problem is that of short stature, underactivity, or overweight and obesity. Parents, teachers, and school food service personnel should watch for over-eating. Daily exercise should be encouraged and empty calorie foods should not be given. It is recommended that food items not be used as a reward. Stickers, posters, or tokens are recommended instead of food.

Epilepsy

Epilepsy is characterized by repeated seizures and abnormal brain wave patterns. Seizures are defined as a loss of consciousness, abnormal movements, and disturbances of feeling and behavior. Epilepsy often occurs with other developmental disabilities such as cerebral palsy.

There are several types of epilepsy.

The major nutritional problems associated with epilepsy may include: disturbances of carbohydrate, fat, or protein metabolism and folic acid and pyridoxine (B-vitamins), calcium, and vitamin D deficiencies largely as a result of anticonvulsant therapy use. Persons with epilepsy often exhibit a loss of appetite, also as a result of the anticonvulsant therapy, which in turn can cause oral problems (see Chapters 16 and 17).

To deal with the loss of appetite, small frequent meals are recommended. The specific nutrient deficiencies, especially noted with use of anticonvulsants, can be taken care of with vitamin and mineral supplements as prescribed by a physician.

Since the early 1900's, the use of a ketogenic diet for seizure control has been suggested. This diet has been found useful for some persons with petit mal episodes (loss of consciousness for a few seconds) and grand mal seizures (loss of consciousness for one or more minutes), and has been used for some children with an inability to tolerate drug therapy. The ketogenic diet is high in fat and very low in protein and carbohydrates. It is thought that ketones (resulting from lack of carbohydrates in the diet) decrease the number and severity of seizures. (This diet must be used only under a physicians care, and should never be implemented without a physician's orders).

The following has:

Calories	1500 grams
Protein	20 grams
Carbohydrates	18 grams
Fat	150 grams

Daily vitamin and mineral supplements are prescribed if needed.

Sample Feeding Schedule

Breakfast	bacon	4 strips
	egg	1 medium sized
	whole wheat toast	1/2 slice
	orange juice	1/4 cup
	almonds	10 whole
Lunch	Lettuce Salad (use only lettuce	1 cup
	Olives (green or ripe)	10 small
	Pecans	10 lg. whole
	Whipped cream* (heavy)	4 tablespoons
Dinner (supper)	Lettuce Salad (lettuce only)	1 cup
	Celery sticks	2-3 inch sticks
	Peanut butter	2 tablespoons
	Bacon	4 strips
	Olives (green or ripe)	5 small
	Salad Oil	2 teaspoons
	Whipped Cream* (heavy)	2 tablespoons

Snacks (may be eaten at various times throughout the day)	Celery sticks	2-3 inch sticks
	Cream cheese	1 cubic inch
	Peanuts	20 Spanish or 10 Virginia
	Whipped cream* (heavy)	1 tablespoon

*can have artificial flavoring

Cleft Lip and Palate

Persons with cleft lip and palate have an incompletely formed lip and palate closure. This occurs during pregnancy because of a number of factors. Corrective surgery can usually take care of the problem. Before the cleft lip surgery is performed (usually in the newborn period), it may be necessary to use special nipples and infant feeders. These are available at most hospitals and pharmacies.

Immediately after surgery a child will usually go on a clear liquid diet, which is nutritionally inadequate. From there, progression to a full liquid diet is made (see Guide 1-2).

Phenylketonuria (PKU)

PKU is an inherited inability of the body to utilize (metabolize) a certain amino acid (phenylalanine) because of enzyme deficiencies. This amino acid is found in protein foods such as eggs, meat, dairy products, and soybeans. PKU can be diagnosed shortly after birth. If untreated it can result in severe mental retardation and other problems such as convulsions, behavior problems, severe skin rash, and a musty odor of the body and urine. With early diagnosis and a specially prescribed diet, persons with PKU can lead normal, active, and healthy lifestyles. However, it is important to point out that women with PKU, are at risk for bearing children with mental retardation and other medical problems if they are not on a controlled diet durng pregnancy.

Once an infant is diagnosed as having PKU, the physician, registered dietitian, and parents or caretakers must work on the dietary treatment. At that time most of the caloric intake is in the form of a special formula (e.g., Lofenalac® or Phenyl-Free®), from which nearly all of the phenylalanine has been removed, although a certain amount of phenylalanine must be added to the diet, to allow for normal growth. As the child becomes older, limited amounts of cereals, fruits, and vegetables are usually permitted. Meats, dairy products, and other high-protein foods are usually not allowed during the first five or six years of life. The special formula (Lofenalac® and Phenyl-Free®) provides most of the dietary protein. After age six, a normal diet may be recommended, only under a physician's supervision. Once a child reaches school age, adherence to a diet becomes difficult. It is essential that parents and caretakers work closely with their physician and nutritionist to provide a diet that is adequate in protein, yet not too high in phenylalanine. Recent research has shown that it may even be important that the school age child keep track of their daily phenylalanine intake and become familiar with the foods that are high in phenylalanine to avoid them in their diet.

Learning Disabilities

Learning disabilities refers to a disorder in which one or more of the basic psychological processes involved in understanding or in using language, spoken or written, may manifest itself in an imperfect inability to listen, think, speak, read, write, spell, or do mathematical calculations. Because of the broad definitions, the whole area of learning disabilities and its many manifestations is still under much study. Possible nutrition-related problems could include malnutrition (under- or over-nutrition) or overall poor nutrition (resistance to eating a variety of foods that offer other nutrients than calories). Because the area of learning disabilities and nutrition-related problems is still under study, parents and teachers should first contact a physician if they suspect a nutrition-related problem that may not only impact the child's health, but the learning as well. For example, it has been shown that if a child skips breakfast, their attention span and learning ability in class may be decreased.

Attention Deficit Disorder (ADD)

Psychological tests and observations of teachers and parents are used to diagnose ADD, frequently associated with hyperactivity. Subjective labeling of children as "hyperactive" should never be done without appropriate testing by trained professionals. Several diets have been promoted to treat ADD. At this time, there is no substantial proof that any of these diets can be successfully used in treatment of ADD. Probably the most well known of these diets is the Feingold Diet. From his observations, Feingold has suggested a diet free of salicylates (as found in aspirin) and food additives. Because of the difficulty in preparing the diet and the many other factors such as a "special feeding room" and "increased attention" that the children on the diet receive, there is no concrete evidence that the diet is consistently effective. A varied diet and few concentrated sweets, especially for snacks and to replace meals, appears to be the most appropriate diet for ADD at this time. It should, however, be pointed out that there are no apparent harmful (or helpful) effects from the Feingold diet. Those persons who wish to follow this type of treatment may do so under a physician's supervision, as long as other prescribed therapy is not discontinued.

Spina Bifida (Myelomeningocele)

Spina bifida is a malformation (at birth) of the spinal cord. A majority of the persons with spina bifida have overweight problems. This is partially attributed to the physical disabilities caused by this handicapping condition. Calorie intake of persons with spina bifida should be closely monitored from infancy.

Prevention of obesity should be a goal if overweight problems begin to appear. A 1000 calorie diet may be used under the close supervision of a registered dietitian (see Guide 1-5 and Chapter 5).

In addition to overweight, persons with spina bifida may have constipation because of lack of activity. A high fiber diet is recommended. Oatmeal, unprocessed bran, and fresh fruits and vegetables are among the highest food sources of fiber.

Special dietary planning can prevent urinary tract infections that are common with spina bifida. One should serve foods that produce an acid "end product" in the body after they are broken down. Foods that are recommended in the "Acid Ash Diet" include:

- breads
- crackers
- pastries
- eggs
- corn
- walnuts, peanuts
- cereals
- pasta products, including rice
- meat, fish, poultry and cheese
- lentils
- cranberries, plums and prunes

Milk should be limited to one pint daily. Cranberry juice can be used as an additional daily fluid source. Fruits, other than those listed as producing an acid end-product, should be limited to one serving (1/2 cup) per day. Vegetables, including potatoes, should be limited to two servings per day. The following foods are omitted in the diet: gingerale, cola beverages, root beer, items made with baking powder or soda, dried apricots, bananas, dates, figs, raisins, rhubarb, dried beans, beet greens, dandelion greens, carrots, swiss chard, lima beans, chocolate, syrups, other nuts, olives, and pickles.

Prader-Willi Syndrome

Prader Willi is most simply defined as an uncontrollable urge to eat large amounts of food resulting in severe obesity (see Guides 7-1 and 7-2). Prader-Willi is characterized by persons who are usually mentally retarded, obese, have short stature, small hands and feet, and underdeveloped genitalia (reproductive organs). Usually, Prader-Willi is not evident until after the second year of life. In Prader-Willi there is an inability to distinguish between appetite and actual hunger.

It is not uncommon to see a Prader-Willi child or adult digging in garbage cans, eating cat food, or eating whatever they can find, regardless of taste. With these persons, a well-planned behavior modification program and low calorie diet should be implemented with the close consultation of a psychologist and registered dietitian. A support and information group for parents and professionals, dealing with Prader-Willi, has been established in Minnesota (see Chapter 18 - Volunteer Organizations).

Autism

Autism is a term used to identify a variety of characteristics in which a child is unable to express meaningful interactions with other persons through language delays or emotional disturbances. Although it has been suggested that large amounts of some vitamins may be used to treat autism, no long-term evidence supports this. In fact, as mentioned in Chapter 3, this could be very dangerous to the child. Some medications, used in treatment of autism, may cause some adverse drug-nutrient interactions (see Chapter 17).

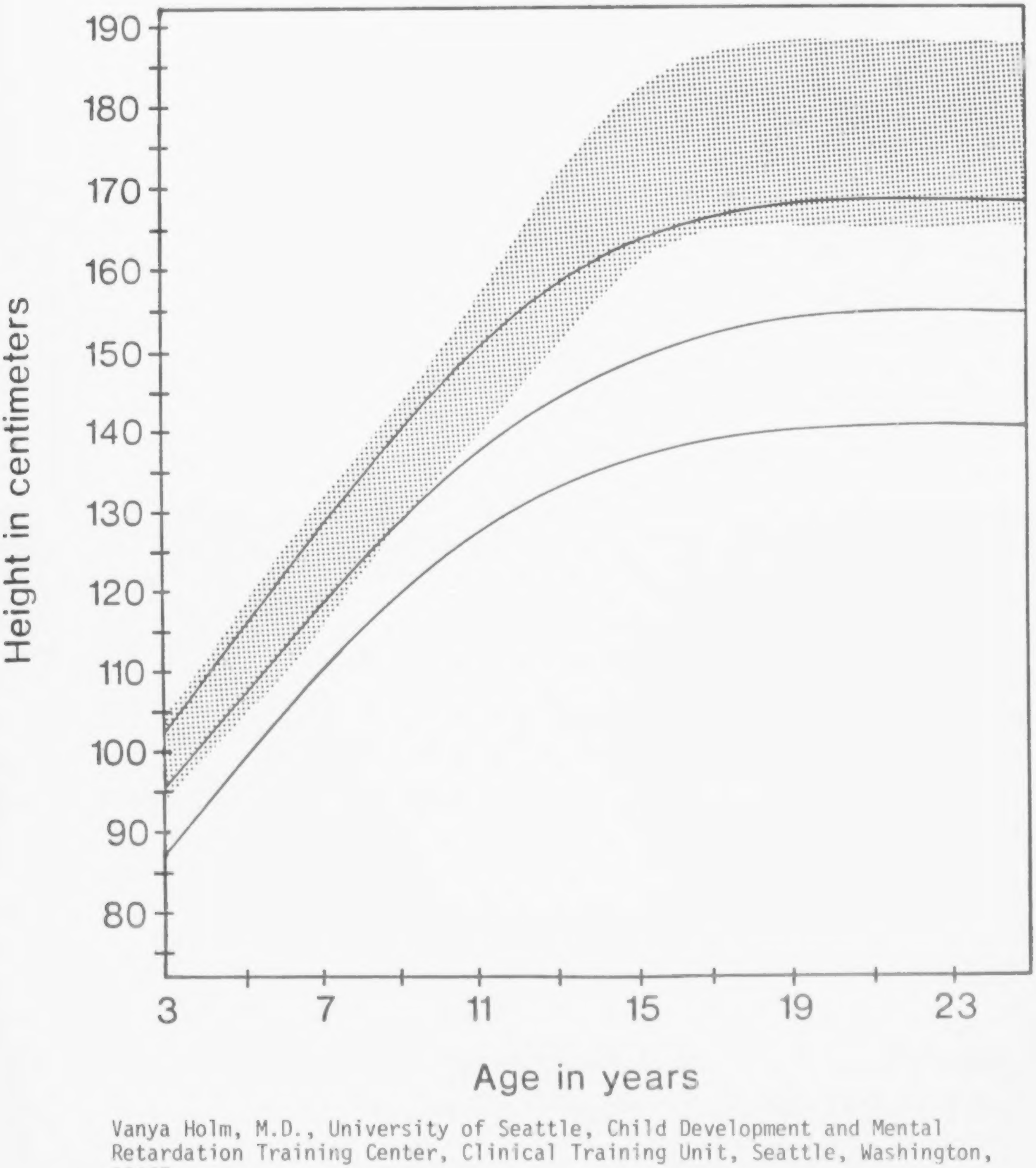
Food Allergies and Food Sensitivities

If it has been determined by examination and laboratory testing that a patient has a food allergy or food sensitivity, a special diet will be developed by a physician in cooperation with a nutritionist. These instructions have to be followed and reactions of the patient to the different foodstuffs have to be observed and recorded. Any restricted diet should never be instituted without professional input, solely upon observations and suggestions of parents or other lay persons. Vitamin and mineral supplements must be considered.

GUIDE 7-1

GROWTH CHART FOR PRADER-WILLI

MALES



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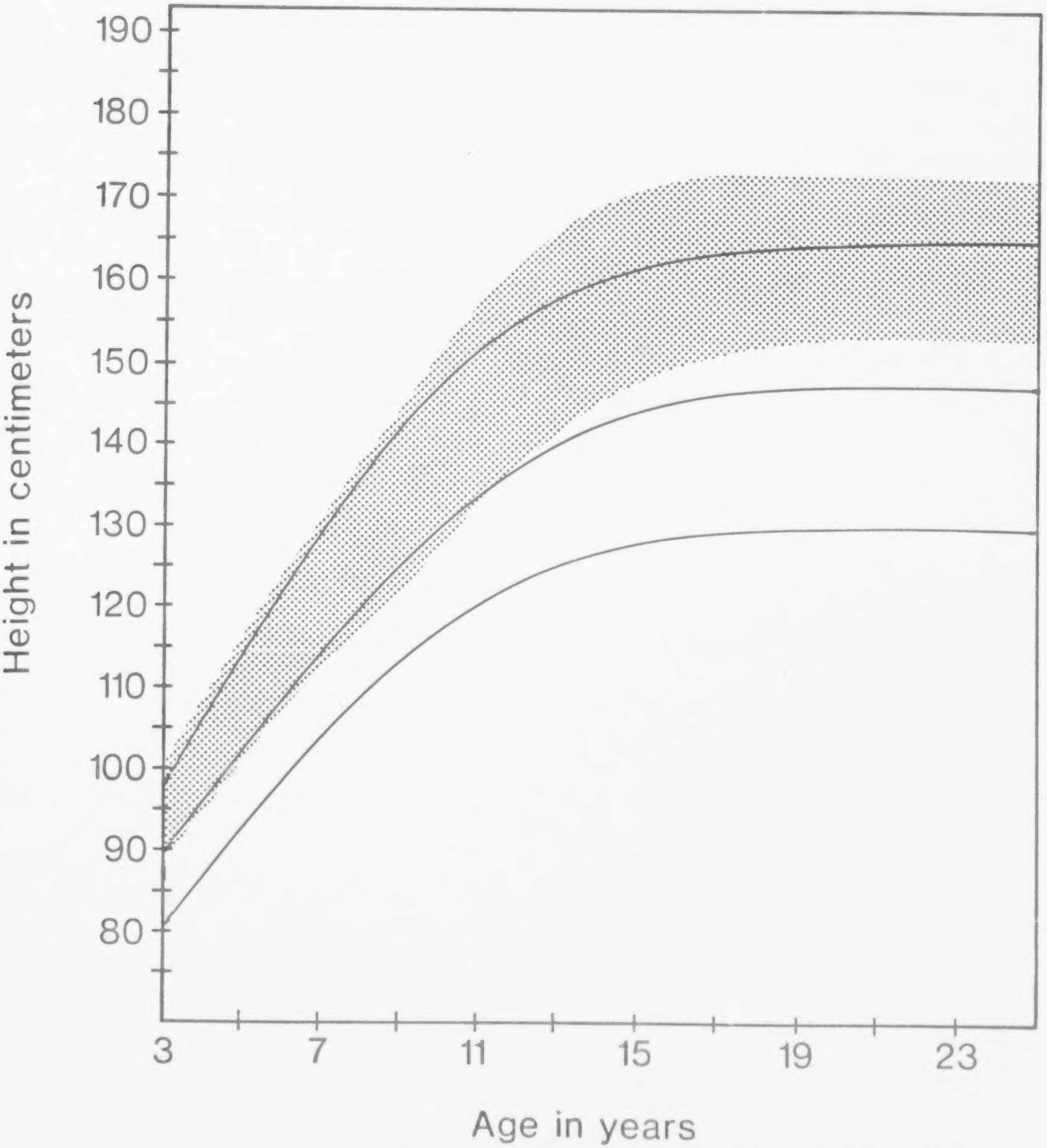
GUIDE 7-2

GROWTH CHART FOR PRADER-WILLI

FEMALES



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Management of Low or Excessive Appetite

8

MANAGEMEMENT OF LOW OR EXCESSIVE APPETITE

Medical dictionaries define appetite as a natural and recurring desire for food. Excessive appetite is referred to as bulimia. Perverted appetite refers to a longing for indigestible things other than food, another term for this is pica. Appetite is an affective state associated with pleasure. It does not depend entirely on need and may persist even after the need (hunger) has been satisfied. Psychological conditioning is an important part of appetite.

In discussing appetite, one has to contend with hunger and satiety (fullness). Hunger is a sensation produced by the awareness of the need to eat food after the body has used all of its nutrients. Satiety is the opposite of hunger. It is a feeling of fullness when hunger has been satisfied and the desire to eat food no longer exists. The control of these feelings of hunger and fullness, as they have a bearing on appetite, is not well defined.

Hunger would indicate that the store of energy is used up; satiety would indicate that the store of energy is restored. Body weight and composition are usually constant. If persons are force-fed above their caloric needs, they will become overweight. However, left to their own devices, they will naturally decrease their intake and return to their normal weight. Some obese individuals lack these signals that would normally inform them that caloric needs are satisfied or that energy stores are appropriate.

The central nervous system's control of appetite is complex. To add to this complexity is the fact that the gastrointestinal tract also plays a part in hunger and satiety. Some form of satiety appears to originate in the mouth and throat area. Persons who are unable to swallow food and are fed through a gastrostomy (an opening directly from the abdomen into the stomach) appear to have an appropriate feeling of fullness by being allowed to chew the food first before it is deposited in the stomach through the gastrostomy. Hunger feelings occur with an empty stomach, and a sense of fullness that suppresses appetite is achieved following feeding. Bulk foods without caloric value but filling the stomach also satisfy appetite temporarily. In rare instances surgical procedures might be indicated in the management of gross obesity.

Quite often, it is difficult to define where the problem lies. Low appetite may result in "failure to thrive," a term commonly used in children who fail to gain in height and weight because of poor sucking, gagging, regurgitation, vomiting, aspiration or refusual to take food.

It should be mentioned too that, on occasion, a child may fail to thrive despite a reported ravenous appetite. When these children are kept in a controlled environment their food intake is adequate and weight gain appropriate. Upon returning home, the previously reported pattern resumes. The causes are probably psychosocial, such as child abuse or neglect.

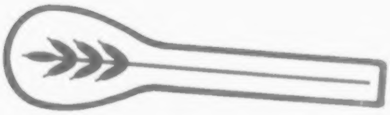
One can see that it is often difficult to explain the cause, let alone treat or modify appetite abnormalities in the DD population. There may be a central nervous system, structural, or functional abnormality that is difficult, if not impossible, to rectify. There is only one medication known which has as one of its side effects the increase of appetite (Cyproheptadine). Insulin has been used to decrease glucose in the blood bringing about hunger; however, this is not an intervention that can be done outside of a controlled setting, and is not a routine clinical practice.

The need to decrease appetite is evident in situations where it is excessive as in Prader-Willi syndrome. Or in situations where the appetite is normal, there might be a decreased activity level resulting in a positive energy balance. This can be the case in obesity in Down syndrome.

Increased appetite requires low calorie menu planning using a registered dietitian who works closely with parents and teachers in that process. Decreased appetite, on the other hand, involves not only creative menu planning but also should include the following practical suggestions:

1. serve a variety of foods in a variety of forms
2. never force feed
3. Introduce new foods when a child is most hungry
4. fortify food if appetite does not improve
5. include several small meals or snacks throughout the day (refer to Guide 8-1 for recipes).

An option, which actually has nothing to do with appetite, is to change the caloric content of food. In situations where appetite is poor and food intake is low, foods with high caloric value can be utilized. For instance, infants scheduled for cardiac surgery or cleft palate surgery who need to gain weight before surgery can be given formula supplemented with Medium Chain Triglycerides (MCT) or other food supplements. Conversely, for individuals with excessive food intake, the caloric intake can be decreased by adding more bulk to the food giving such individuals a sense of fullness without excess caloric value. It goes without saying that these individuals also may need a feeding evaluation (refer to Chapter 13).



GUIDE 8-1

BEVERAGE IDEAS TO INCREASE APPETITE

1) Serve 100% cranberry juice or unsweetened grape juice before a meal (4-8 oz.)

2) Serve broth or bouillon before a meal (1/2 cup)

Tomato Zing

Mix in blender:

2 c. tomato juice
1 small cucumber, chopped
1 stalk celery, chopped
1 T. dried or 2 T fresh parsley
1 small carrot, chopped
2 t. paprika
4 ice cubes
Pour into glasses and garnish with a celery stick.

Yield: 4 cups
Calories per cup: 39

Fruit Cooler

Mix in blender:

1 orange, peeled and sectioned
1 banana, peeled and sliced
1 c. unsweetened apple juice
6 ice cubes

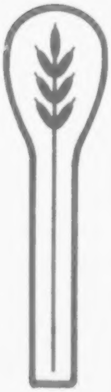
Yield 3 cups
Calories per cup: 150

Melon Cooler

Mix in blender:

1 1/2 c. ice cubes
1 1/2 c. cubed fresh or unsweetened frozen watermelon, cantaloupe or honeydew, thawed
1/2 t. lemon juice

Yield: 2 1/2 cups
Calories per cup: 29



Refusal to Eat Certain Foods

9

REFUSAL TO EAT CERTAIN FOODS

Refusal to eat certain foods can grow out of a physical problem, mental disability, environmental obstacle, objectionable food odor, behavioral problem, individual food (taste) dislike, or association of a food eaten during a period of illness when vomiting or discomfort occurred.

Normally, every person should be able to decide whether or not to eat. All children go through periods when food is not as important as are other interests. Their appetites may be reduced during slow growth periods, and they may develop particular food preferences, eating only one or two foods. When these conditions are carried to extremes, or when they interfere with growth and development, they do constitute a problem.

It is important to be able to distinguish between minor complaints that are temporary and problems that have a potentially dangerous outcome. When a child refuses to eat a variety of foods over a long period of time (six months and longer) there is a possibility of considerable weight loss, growth retardation, and severe malnutrition. Problems may arise if this is not recognized or treated. A physician should be alerted when refusal to eat persists.

Increasing Food Acceptance

When a child refuses to eat a certain food, one should first check the physical characteristics of the food. The following questions should be answered:

1. Is it difficult for the child to chew or swallow?
2. Is the child eating only soft foods at home? This is frequently found in developmentally disabled persons.
3. Would it help to change the texture of the food (e.g., chopped, mashed, mixed with a sauce, etc.)? The latter can be done without influencing the nutritional content. Avoid overuse of blended, pureed, and soft foods.

The inside of the mouth (periodontal tissue) can become so accustomed to soft foods that crisp or crunchy foods can actually be painful to the person. If soft or pureed foods are served for too long a period of time, interest in food may fade. Parents and teachers should watch for signs of rotary chewing motions that indicate a person may be ready for chopped foods. Going to a new food texture always requires time and patience on the part of the teacher and parent.

If the food is in a form that the person can swallow, check their ability to reach out for the food and feed themselves. An individual may refuse to eat because of embarassment occurring with food spillage or inability to eat independently.

Some persons may also refuse to eat because of facial hypersensitivity. In other words, they are extremely sensitive around the mouth. This can be caused by lack of facial and oral stimulation during infancy and early childhood, or long-term use of a stomach tube. Teachers and parents should work closely with an occupational therapist who can provide them with facial exercise activities to increase oral stimulation. Practically, parents and teachers should provide facial and oral contact using hands, soft towels, food items (such as puddings, soft bread, peanut butter or jello), and plastic-coated or all-plastic "Mothercare"® spoons (see Chapter 18).

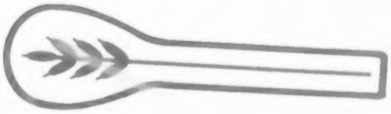
A child may need time to develop a taste for a new food. The texture of a familiar food prepared in an unusual manner may bring out negative reactions. It may take a child as long as two years to accept new foods. These should always be introduced in small amounts. When a new food is eaten, the child should be reinforced. Verbal praise and non-food reinforcers such as stickers or posters work well in both the school and home situation. If a food is rejected three or more times, a different form of the food should be introduced (e.g., cooked vs. raw).

Teachers, parents, and school lunch staff should ensure a tension-free mealtime atmosphere. For handicapped children, a half hour to one hour may be needed for lunch. A hurried or noisy environment can increase tension and continued refusal to eat.

If children refuse to eat in the home and in the school, parents should monitor the child's snacking habits. When children nibble only on favorite foods, this can cause nutritional problems. Parents and teachers should also watch for overfeeding because of concern and guilt over the refusal to eat certain foods. A child does not have an adult's appetite. Further, a handicapped child may not expend the energy of a non-handicapped child in general daily activity.

The National School Lunch Program provides standards for adequate amounts of food needed by children to obtain one-third of the Recommended Dietary Allowance (RDA). If refusal to eat is related to a child's behavioral problem, the teacher should work closely with the school psychologist in working out a treatment plan. Teachers and parents should positively reinforce new and acceptable eating behaviors. Undesirable eating habits and refusal to eat certain foods should be pointed out to the child with negative verbal dialogue or time out. The main motivation for eating is to satisfy hunger. If negative behavior, temper tantrums, and refusal to eat persist, food and liquid, except water, should be withheld. As the child requests food, a new or not-accepted food should be introduced, followed by an accepted food or liquid. This should be done only with consultation of a physician and registered dietitian and should only be done if all other efforts to increase eating have failed.

For practical suggestions to stimulate eating refer to Guide 9-1.



GUIDE 9-1

PRACTICAL SUGGESTIONS TO STIMULATE EATING

1. Introduce foods in different forms (e.g., raw, steamed, cooked, mashed, blended, pureed).

2. Mix a favorite food with a new food (e.g., hamburger with a mashed vegetable, liver mixed into hamburger, finely chopped vegetables mixed into casseroles, mashed legumes mixed into casseroles, applesauce mixed with stewed prunes and cereal, crushed pineapple mixed with sweet potatoes).

3. Provide a relaxed, and cheerful eating environment.

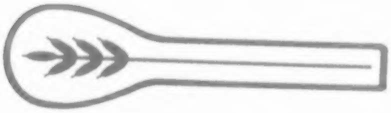
4. Encourage "play" with new foods to increase tactile stimulation. This includes food activities in the home and classroom such as work with bread dough, peanut butter, or pudding.

5. Give a small piece of a favorite food with a small piece of a new or not-accepted food.

6. If mashed, blended, or pureed foods need to be used, never mix several of the foods together (e.g., vegetable, meat, and bread). Try to individually blend the foods and serve them attractively. If "textured" foods such as pizza or tacos are on a menu, try to serve a softshell taco or bread pizza or serve mashed or blended components of the pizza or taco such as meat topped with melted cheese, vegetables with tomatoes.

7. If refusal to eat is related to behavioral problems, food and drink, except water, may need to be withheld, with appropriate safeguards (see Chapter 9).

8. Provide on-going encouragement and verbal praise.



Unusual Feeding Problems

10

UNUSUAL FEEDING PROBLEMS

Feeding problems are disturbances which interfere with the transportation of food into the stomach. The causes may be mechanical (such as inadequate size of holes in the nipples), neuromuscular (such as a disturbance in the swallowing process), psychological (such as rumination), developmental (such as inadequate sucking reflex), nutritional (such as over- and underfeeding), and eating of inedible material (such as dirt, clay, etc.), also known as pica. The ingestion of fecal matter, known as coprophagy, is rarely seen in mild or moderate developmental disabilities but can occur in more severe cases. Family and societal habits, personal preferences, and economic factors should be considered before taking specific measures.

History and Documentation

When a feeding problem is suspected, it is important to get a good history from the parent or caretaker and to amplify this by personal observation. Special attention must be paid to the interactions between the parent or caretaker and the child. This is even more important for the younger child. Psychiatric histories of problem children, in retrospect, often reveal early feeding disturbances.

Since one of the possible causes is a disturbance of the interaction between the mother and the child, the feeding process itself must be observed in order to detect any interfering actions. It is also important to listen to the complaints of the mother. Some children who exhibit eating problems need the constancy of a single helper (mother, teacher, etc.) during mealtime.

On the other hand, there are some children who have a temperamental style which makes it difficult to care for them and to feed them. They have irregular habits (feeding, sleeping, eliminating), negative attitudes (even towards enjoyable activities) and impulsive behavior (given to loud and sudden outbursts). Proper identification of these disturbances is important so as to advise the parents or caretakers of countermeasures and adaptive techniques in order to correct these eating problems. A psychologist may be helpful in modifying the behavior of these children.

Eating of Inedible Material (Pica)

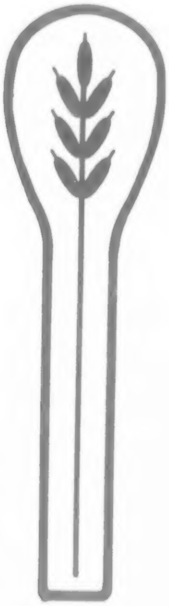
If a person regularly eats material of no food value, the disorder is called pica. This may involve plaster, paint, clay, earth, ashes, feces, charcoal, etc. (see Guide 10-1). Pica behavior can be very similar to finger feeding. While small children, especially those with developmental disabilities, place these substances in their mouth normally for investigation, it is considered abnormal behavior in anyone older than two years of age. There seems to be a pattern of prolonged finger feeding in children who engage in pica behavior. Those children who do not engage in pica behavior seem to have had some early training in the use of eating utensils. However, it has also been found that once pica behavior is established, teaching utensil usage does not eliminate the pica behavior. The utensil-using stage must be developed before the pica behavior gets well established.

When evaluating these children one may find environmental disorganization, lack of parental affection, neglect, and poor supervision. Removal of these conditions at mealtime will help to improve the child's eating habits. Pica is rather dangerous as it can lead to infections, infestations with parasites, Vitamin C and D deficiencies, lead poisoning, anemia, low phosphate levels, and other general illnesses. If simple measures fail to stop this behavior, medical and psychological advice ought to be sought. For practical suggestions in treatment of unusual eating habits see Guide 10-2.

Prevention of Feeding Problems

The development of a warm and supportive mother(or caretaker)-child relationship is the cornerstone of preventing feeding problems. Good techniques are necessary and can be taught.

Early recognition of problems improves the outlook for their correction. Being aware that the signs and symptoms of a feeding problem may indicate deeper-seated psychological or medical problems prevents a delay of appropriate treatment. For more detailed description on these subjects, one needs to consult appropriate textbooks or seek expert advice.



GUIDE 10-1

NON-FOOD ITEMS OFTEN ASSOCIATED WITH PICA

Strings, rags
Stool, urine, vomit
Soil (significantly more common in the summer)
Floor dirt
Sand, rocks (significantly more common in the summer)
Clay
Paper
Cigarettes
Nondiscriminant (variety)
Oak leaves (significantly more common in the summer)
Grass (significantly more common in the summer)
Metal, glass, plastic, putty
Wood, bark, twigs (summer)
Toiletries, soup
Hair, nails
Insects (summer)
Paint chips
Toilet water
Coffee grounds
Food from trash
Food fetish
Wild berries and mushrooms (summer)

GUIDE 10-2

SUGGESTIONS IN TREATMENT OF UNUSUAL EATING HABITS

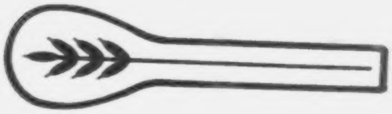
1. Parents and teachers should observe children closely if they suspect an unusual eating habit. Medical and psychological assistance should be sought if the problem appears to be severe.

2. For unusual eating habits (pica or coprophagy), the teacher and parents can work closely with the school psychologist to teach the child to accept responsibility for the misbehavior and to direct the child's responses by overcorrecting the improper and potentially dangerous behavior. For example, if a child consumes a non-food item, he or she should be taught about keeping the mouth and hands clean and showing what can happen if the wrong items are handled and eaten. This is called "Restitutional Overcorrection."

3. For treatment of pica, teachers and parents may work with the school psychologist on a combination of time-out and reinforcement behavior therapy. Favorite and wholesome food items to insure a proper diet and non-food items such as stickers, posters, and recess time can be used for reinforcement.

4. The finger feeding phase of eating development in children with pica should be done away with if the children are moderately, severely, or profoundly retarded.

5. Remember always that mealtimes are important both socially, nutritionally and for the learning and developing of skills. School lunch rooms and home mealtime environments should be calm and provide for a slow paced eating environment and should last a minimum of 45 minutes.



Gagging, Vomiting and Rumination

11

GAGGING, VOMITING, AND RUMINATION

Problems such as gagging, vomiting and rumination have different origins and are quite frustrating for the child, parent, or caretaker. They may lead to malnutrition and severe vitamin or mineral depletion.

Gagging

The development of oral reflexes may be delayed or extend longer than usual, creating problems in the normal development of eating skills (for all other oral reflexes except the gag reflex, refer to Chapter 13). In normal development the gag reflex is stimulated by touching the back of the tongue. This reflex protects the foodpipe (esophagus) and prevents inappropriate food from being swallowed or inhaled into the windpipe (trachea). This reflex normally remains throughout life.

Excessively weak and strong gag reflexes can cause eating difficulties. At any stage of development, they will create problems with the chewing and eating ability of an individual. If the strong, overactive gag reflex does not fade when chewing begins it will interfere when solid foods are given. The weak gag reflex may allow aspiration and choking, so it must be strengthened.

Dealing with Gagging Problems

The strong gag reflex may be inhibited by using the ball end of a swizzle stick, or small tongue depresser and touching the tongue in the center, starting in front and "walking" back with pressure. Maintain the pressure until the tongue humps for swallowing. This procedure should be repeated five to seven times, then alternated with a food-filled spoon that is used to press down on the tongue and to place the food laterally in the mouth. Remove the spoon as quickly as possible. The weak gag reflex can be increased by using a swizzle stick, a fiber brush such as a toothbrush, or a soft textile brush to stretch the very back portion of the roof of the mouth, where the tissues form an arch.

If hypersensitivity in the oral area seems to be a cause for gagging, a desensitization program may be appropriate. Deep pressure may be applied to the gums. This procedure can be learned with guidance from an occupational or speech therapist. The child may also be encouraged to put soft rubber toys into the mouth. Parents and teachers should be encouraged to stimulate oral sensitivity by increasing facial contact with food and soft items such as a towel or damp cloth. Paper items may be too abrasive. Children with oral sensitivity should be allowed to play and experiment with their food, and to use their hands to "feel" the food. The contact of the face with the child's hands and food will usually follow.

Gagging may be used by a person as an attention getting device or a form of tantrum. If this is the case, the behavior should be ignored. In some individuals, gagging may also be a form of communication to show a dislike for the food being served.

Choking can also be the result of neuromuscular problems. Teachers, parents, and food service staff should become familiar with the Heimlich maneuver, and be prepared to use it whenever necessary. Developmentally disabled persons may choke on anything from a soda cracker to ground meat.

Regurgitation

If small amounts of food are brought back during or after the feeding, it is usually called "spitting up" (or "regurgitation"). A more forceful emptying of the stomach at any time is "vomiting".

While some spitting is normal, especially when associated with the escape of air from the stomach (so called "burping") it should subside in the first half year of life, usually by changing the feeding techniques for improved burping, or placing the child on his right side after feeding. If large amounts of food are lost, one has to consider the possibility of some functional or anatomical problem and medical help should be sought, before undernutrition becomes a presenting symptom.

Vomiting

Vomiting, the expulsion of food from the stomach, is a more serious sign and can be associated with a great number of psychological and medical problems. If it is continuous or persistent, it may endanger the health (for example by causing bleeding from the upper gastrointestinal tract or failure to thrive) and a full medical investigation is advised. Some causes of vomiting may be due to improper feeding or overfeeding, bacterial or viral infection, (the latter is commonly called "flu") or a physical problem in the digestive system. Chronic vomiting in some persons has been diagnosed due to gastroesophageal reflux (for definition, see later in this chapter). If frequent complications such as pneumonia, gastrointestinal blood loss, or malnutrition are found, a surgical procedure to make vomiting impossible can be performed. Some post-operative problems can arise, but follow-up examination later indicated no further vomiting or gastrointestional blood losses. The selection of this procedure is a decision of experienced physicians.

Dealing With Vomiting Problems

If a child is vomiting, large amounts of fluids will be lost by the body, so the child will need to drink more liquids than usual to prevent dehydration. It is a good rule to have the child drink no less than 1/4-1/2 cup each hour. Clear liquid foods such as broth, water, pure fruit juices, Jello®, tea, and popsicles can be given. When there has been no vomiting for six hours, gradually add ice cream or sherbert, soups, bananas, rice, toast, apples or applesauce, and dairy foods.

If the child has a fever of 101 degrees (by mouth or rectum), has blood in the vomitus, or if dehydration is suspected, a physician should be called immediately. Dehydration signs to watch for are excessive thirst, drowsiness, increased breathing or increased pulse rate, and the loss of appetite (for a complete description see Chapter 12 under dehydration). Parents and teachers should carefully monitor actual fluid intake. Estimations can prove dangerous. Children can be encouraged to accept fluids by offering small frequent sips and by thickened fluids (e.g., soups and stews with added crackers, or milk, fruit juices or fruit shakes).

Fruit Milkshake

1 c. milk
1 medium mashed banana or 1/2 c. fruit
1/2 c. baby cereal

Orange Shake

1/2 c. orange juice*
1/2 c. orange sherbert
1/4 c. baby cereal

*other flavors may be used

Children who vomit frequently need an increased fluid intake on a regular basis and should be encouraged to eat foods that become liquid at room temperature such as ice cream and sherbert, jello, and popsicles. Meals should include foods that contain large quantities of fluids such as soups, fruit and vegetable juices, and dairy products. Solid foods that contain fluids are listed in Guide 11-1. The daily recommended fluid allowances are listed in Guide 4-2.

Rumination

Rumination is a syndrome in which the individual returns previously swallowed food to the mouth either to be spit out, or to be rechewed and reswallowed. It sometimes occurs in association with vomiting. Unlike vomiting it is not an unpleasant experience and is usually accompanied by a feeling of gratification and satiety. Rumination occurs in many settings. Institutions report that between six and eight percent of the children have been observed practicing rumination. It may occur several times throughout the day.

Rumination has been noted to occur more frequently in the developmentally disabled population. It may be a symptom of psychological problems such as a disturbed mother-child relationship, or have organic causes. It is sometimes confused with food allergies. If it goes untreated it can cause electrolyte (minerals such as sodium and potassium) disturbances, fluid loss, failure to thrive, malnutrition, a lowered resistance to disease, or even death. It also detracts from the physical appearance, causes gradual decay of teeth, and the person may become a social outcast.

Dealing With Rumination Problems

Individuals who ruminate engage in intentional behaviors to induce response, which suggests the condition may be under environmental control. It has long been recognized that rumination arose from a failure to provide sufficient mothering stimuli such as handling, rocking, and fondling. Recently, other psychological implications have been stressed as a causal factor. Rumination can also be seen as an infant's response to an unstable mother or lack of stimulation and gratification. It has been found that using a pacifier is sometimes useful for supplying additional oral stimulation provided the child has had sufficient feeding. The one-to-one mother-like stimuli of fondling, rocking, crooning and oral stimulation during the feeding process has been reported as decreasing the occurrence of rumination.

A food satiation procedure allowing the child to eat double portions of the standard meal, in addition to cereal, ice cream, and milk shakes has also been used. Satiation (complete fullness) was achieved when the child refused food twice within a one-minute interval. The procedure was effective in over one-half of the children. When tactile stimuli are combined with food satiation, the rumination response decreased and eventually was eliminated. Another procedure gave additional food to the child during the first hour after a regular meal. Enough food was placed in the child's mouth to maintain some food almost continuously. Small pieces of cookies, or bits of peanut butter can be used as reinforcers against rumination. This procedure is successful, rapid, and easily implemented.

Others have used food satiation and an oral hygiene procedure to treat rumination. Some suppression was achieved from food satiation alone, but almost complete elimination of rumination was attained when oral hygiene procedures were added. The oral hygiene procedure has several advantages over other behavior procedures in that the oral antiseptic cleans the child's gums and teeth, eliminates foul-smelling breath, and controls decaying of teeth (see Chapter 14 for description of the procedure). Thus the interdisciplinary efforts of the dentist, dental hygienist, psychologist, parents, and teachers are encouraged along with medical and nutrition therapy.

A physical condition that causes a child to regurgitate or ruminate is the relaxation of the opening of the stomach (so called gastroesophageal reflux). After food passes into the stomach, there is increased pressure which pushes the food upward. Spasms of the stomach are another reason why large amounts of food cannot be tolerated without a backward push. If this is suspected, appropriate medical advice ought to be sought.

Since the child that vomits or ruminates is often malnourished, it is important to do a thorough nutritional assessment (see Chapter 1). The dietary history may be helpful, but it will be difficult to assess the amount of food lost by spillage or vomitus. Daily records do need to be kept prior to and during treatment. Special attention should be given to caloric and protein intake. The protein intake must be equal to the losses (measured as nitrogen) in the urine, fecal matter, skin, and expressed vomitus. If there is insufficient calorie intake there may be a negative nitrogen balance, because the body uses protein for energy rather than for protein synthesis.

Height, weight, chest circumference, and triceps skinfold should be measured at the beginning of the treatment, then again periodically throughout the program. Weight should be measured daily. Results should be placed on a growth chart to give a clear picture of progress. A full nutritional assessment is described in Chapter 2.

The patient should be maintained on a high calorie and high protein diet in order to restore muscle mass and promote weight gain. Each case should be treated individually, but a rule of thumb to use, could be to increase the calories and protein to one-third above the Recommended Dietary Allowances (RDA). The physician and registered dietitian should work closely together with the parents on monitoring progress (refer to Guide 11-2 for management recommendations).

GUIDE 11-1

FOODS WITH HIGH FLUID CONTENT

- Commercially prepared baby foods
- Cottage cheese
- Custards
- Fruit slushes
- Fruits and Vegetables (e.g., canned, frozen, fresh, cooked or raw)
- Ice cream or sherbet
- Malts and shakes
- Popsicles
- Pudding
- Soups
- Yogurt

GUIDE 11-2

TECHNIQUES FOR THE MANAGEMENT OF RUMINATION

1. Mealtimes should be relaxed and quiet. Food should be eaten slowly. Inattentive or hurried eating may result in defective chewing.
2. Excessive intake of liquids during or soon after meals may precipitate ruminative behavior and should be discouraged.
3. Eating raw or coarse foods might induce rumination behavior and should be avoided.
4. Stimulation of the gastric mucosa should be avoided, thus bland foods may be indicated.
5. High-concentrated dietary fat may cause diarrhea and dehydration and should be avoided.
6. Smaller but more frequent feedings will deter prolonged emptiness or overloading of the stomach.
7. Thicker liquids, (e.g., milkshakes), may be given, as they are harder to regurgitate.
8. Anecdotal evidence suggests that giving two tablespoons of peanut butter occasionally during the daytime may reduce rumination.

Acute and Chronic Bowel Problems

12

ACUTE AND CHRONIC BOWEL PROBLEMS

Problems with bowel function are a frequent occurrence at any time in life. However, the type varies with age. For example, acute gastroenteritis due to infections, manifested by acute onset of watery stools, is most common in young children. The irritable bowel syndrome is more frequently diagnosed in adulthood. Constipation is found in all age groups, and congenital disorders manifest themselves shortly after birth.

Since similar symptoms have a variety of causes and need individual measures, only some general guidelines can be given. Any disease not responding to simple measures within a short time will need specific medical treatment.

Constipation

Short or long term constipation (infrequent bowel movements of hard stool) is often associated with developmentally disabled persons primarily because of lack of activity. It is important for parents and teachers to note that the frequency of bowel movements is individual with each person. A once-a-day bowel movement is not the rule for everyone. An irregular pattern and a hard stool are the most important signs to monitor for the presence of constipation.

Constipation can result from inactivity, frequent vomiting, insufficient fluid intake, improper diet, especially lack of fiber in the food (e.g., as in persons who are on a pureed diet for a long time), poor muscle tone (e.g., in Down syndrome), or increased muscle tone (e.g., in spastic cerebral palsy), and obesity.

As a rule, laxatives and enemas are not recommended for long term treatment since this can lead to dependency. Mineral oils are not recommended because they decrease the absorption of fat soluble vitamins (e.g., vitamins A, D, E, and K). The best management is a high fiber diet, high fluid intake, and increased exercise (for practical recommendations and recipes see Guide 12-1).

Acute Diarrhea

Acute diarrhea (gastroenteritis) is a common illness, especially in young children. It occurs more often in the wintertime and is usually caused by virus infections. The symptoms are a sudden onset of abdominal cramps, vomiting and frequent explosive watery stools. Fever, blood in the stool, persistent vomiting (beyond four to six hours) and dehydration (see later this chapter) are usually signs of a more severe illness which needs medical attention.

The majority of the acute diarrheas will respond to simple measures and the child should improve within four to six hours with the suggested management. Non-response to these measures will require medication; therefore, medical help ought to be sought.

The most important advice is to start treatment as early as possible and not to wait until serious symptoms are obvious. The following measures should be taken at the onset:

1. Withhold oral feedings until the vomiting has stopped. This should be achieved within four hours. If not, a physician ought to be contacted.
2. Thereafter start clear fluids. The best suited are commercial solutions like Pedialyte® or Lytren®, which can be obtained in a pharmacy. If not available, Gatorade® (diluted one to one with water) is acceptable. If not available, use lemon-lime flavored clear carbonated beverages but stir first to remove the carbon dioxide. Small sips of these fluids should be given frequently. Avoid fruit juices, especially apple juice.
3. If the patient has improved within 12-24 hours after onset of his symptoms, one may introduce solids, but under no circumstances milk or milk-containing foods. Examples of foods to be used are potatoes, vegetables, fruits, crackers, lean meat, dry toast, zwieback, jello, etc. Fat should be restricted the first few days. If the patient is young, these foods have to be pureed. Instant mashed potatoes usually contain milk, or milk powder, and therefore only mashed potatoes prepared from boiled potatoes should be used. If baby foods are given, one has to read the label. If the patient is an infant, too young for solids, a soy formula should be used instead of milk or solids.
4. Only after the patient is completely well and four to five days after onset of his symptoms, milk can be introduced slowly. If the diarrhea returns, milk should be discontinued immediately for two to four weeks. In young children a soy formula may be given instead.

The following measures should be avoided in the treatment of acute diarrhea: homemade salt-sugar preparations, milk (boiled, skim or any other form), medication without medical advice (especially medication against vomiting, loose stools, antibiotics, etc.) and fruit juices.

With this management, the uncomplicated diarrhea should stop within 24 hours and the child should recover within two to three days. If the child is very young (under six months of age) or not improving within eight to twelve hours, the possibilty of serious illness should be considered and early medical help must be sought.

Chronic Diarrhea

Chronic diarrhea is a diarrhea which persists beyond one to two weeks, despite the above described management, with or without medical management. The patient may be acutely ill or getting sicker, but sometimes appears amazingly well.

There are numerous reasons why a person has this condition, but all need medical attention, laboratory tests, and treatment which frequently includes a special diet. Therefore, these patients should be sent to a physician.

An incomplete listing includes the following causes: infection with Giardia l., very common in day care centers, protein sensitivities (as milk or soy protein intolerances), sugar sensitivities (as sucrase, isomaltase, lactase deficiencies), irritable colon of infancy, irritable bowel syndrome of adults, celiac sprue, and many more rare but less frequent diseases.

Acute and Chronic Abdominal Pain

Abdominal pain, especially the severe and sudden onset of pain, should undergo medical evaluation. Appendicitis is a common occurrence and has, if diagnosed early, an excellent outcome.

However, when the appendix has been removed or is not the source of pain, there remain many other reasons why a person has abdominal pain, especially of the recurrent and chronic type, such as gastroenteritis, manifested by onset of acute diarrhea and chronic diarrhea (causes are already mentioned). Others are infantile colic (one to three months of age), chronic recurrent abdominal pain of childhood (three to fifteen years of age), stomach or duodenal ulcer and some other rare diseases. Some of these need medication, others dietary changes, but all treatments should be individualized.

Malabsorption Syndromes

These illnesses are characterized by either greasy and foul smelling or watery diarrheal stools. They are caused by a digestive deficiency, which prevents the full utilization of nutrients. The stool therefore contains undigested foodstuffs. The analysis of these gives clues to the underlying defect.

The two groups are

1. Diseases associated with fat malabsorption:
   The stools of these patients are fatty and foul smelling. Examples of these are cystic fibrosis, celiac sprue, and a few very rare illnesses.
2. Diseases associated with carbohydrate malabsorption:
   Stools of these patients are watery, and contain large amounts of certain carbohydrates (in the form of specific sugars) and have an acid reaction. Examples are lactase deficiency and glucose-galactose malabsorption.

The treatment consists of special diets and sometimes in the replacement of digestive substances.

Dehydration

Dehydration is a severe imbalance of body fluids which occurs when the fluid output (urine, stool, vomiting and insensible losses through the lungs and skin) exceeds the fluid intake (oral, intravenous, etc.). The manifestations are loss of body weight, reduction or cessation of urination, excessive thirst, loss of appetite, dryness of the mouth and mucous membranes, sunken eyes, increased respiratory and heart rates, drowsiness, paleness, and loss of elasticity of the skin.

These symptoms indicate that the child has severe problems and needs immediate medical attention. A sudden five or more percent decrease of body weight due to fluid losses is a sign of severe dehydration, which may require hospitalization.

As far as normal fluid requirements are concerned see Guide 4-2. In case of dehydration, these values must be exceeded because of replacement needs. This necessitates careful observation of the child and close monitoring of the intake (frequently intravenously) and output, which are only possible in a hospital environment (for solid foods containing fluids see Guide 11-1). Aside from diarrhea, dehydration can occur in febrile illnesses and diabetes.

GUIDE 12-1

PRACTICAL RECOMMENDATIONS FOR THE MANAGEMENT OF CONSTIPATION

1. Maintain adequate fluid intake. This should exceed the daily requirement and should consist of water and diluted fruit juices.
2. Establish regular meal times.
3. Establish a regular sleep schedule.
4. Allow ample time for a bowel movement.
5. Increase daily exercise since this increases intestinal motility. For children, placement in an upright position is recommended.
6. Include in the diet high fiber foods such as:
   - whole grain cereals and bread
   - regular hot or cold cereal
   - cereals fortified with one to two tablespoons of unprocessed bran; (oatmeal is especially effective)
   - raw fruits and vegetables with skin (they can even be pureed with the skin)
   - dried fruits (also high in iron)
   - nuts and seeds (for children 4 years and older provided they can chew well

Special Recipes

Bran Balls

Yield: Approximately 24 balls
Serving 2 balls/day

2 c. unprocessed bran
1 c. peanut butter
1/4 c. honey*
Mix all ingredients and form into 1 inch balls. Raisins, nuts, and chocolate chips can be added, if they can be tolerated.
*May need to add more depending on consistency of peanut butter

Happy Juice

Yield: 1 serving

1/4 c. applesauce
2 tbsp. bran flakes or unprocessed bran
1/4 c. prune juice
Mix all ingredients well and serve as a dessert
This can also be served with ice cream as a topping

Abnormal Motor Patterns Affecting Feeding, Chewing and Swallowing

13

ABNORMAL MOTOR PATTERNS AFFECTING FEEDING, CHEWING, AND SWALLOWING

The answer to the problems related to feeding and swallowing is interdisciplinary cooperation. Combining expertise is the most efficient and successful way to handle the complex issues involved.

A team approach is utilized in a comprehensive assessment of feeding and swallowing abilities. Occupational, speech, and physical therapists who have additional training in the area of feeding and swallowing are qualified professionals who can contribute valuable information in this regard. Additional information concerning medical aspects and nutrition may be obtained from other professionals dealing with the child (e.g., nurse, registered dietitian, physician, psychologist, etc.). A complete assessment of an individuals feeding and swallowing abilities may include the evaluation of the following areas:

1. head/trunk control
2. oral/motor development
3. lip function
4. jaw function
5. tongue function
6. self-feeding skills

In addition to these one must be aware of general considerations that relate to the eating process such as:

1. length of feeding
2. types and amounts of foods eaten
3. medications given at meal time
4. adaptive equipment
5. communicative interactions
6. behavioral aspects.

There are many structured forms for assessing feeding problems. These evaluations are usually carried out by occupational, speech, and physical therapists, who work closely with medical and nutritional professionals. Guide 13-1 is an example.

Feeding problems, however, can be very complex and in need of thorough evaluation, testing, behavior modification, instrumentation, and other therapeutic measures. A good follow-up evaluation is part of any program.

If simple measures are not giving the desired results, a referral to an existing program for evaluation and training is recommended (see Chapter 18, Resources). To illustrate a few of these complex patterns and to offer some recommendations, a description of frequently encountered problems follows. It should be emphasized that any recommendation must be individualized, and the advice given here may not fit a specific child.

1. Structural impediments (e.g., extremely high palate) and functional problems (poor tongue mobility, lack of jaw mobility, decreased lip mobility) can interfere with the chewing process. This results in

poor biting efforts, the need to stick the fingers in the mouth, to stuff the food into and move the food in the mouth, and poor control of saliva. The end result is that the child cannot get enough food to obtain adequate nutrition.
Possible actions are:

a. provision of training exercises for increased tongue, lip and jaw mobility (see Guide 13-2)
b. training to use spoon and fork to improve oral sensitivity and social acceptability
c. extension of the lunchtime, possibly provide a quiet dining area
d. provision of a diet which is soft, but not necessarily pureed, for example the soft diet (see Guide 1-2)
e. referral to a prosthodontic dentist for consideration of a prosthetic device to lower the palate.

2. Structural defects (e.g., severe cleft lip, cleft palate, or a high arched palate resulting in a small chin, and a large appearing tongue which can obstruct the airway by falling backwards, the so-called Pierre-Robin syndrome) are another symptom complex.
Possible actions are:

a. repair of the cleft lip as soon as possible
b. special nipples if bottle fed
c. possible palate prosthesis and repair of the cleft palate at a later date
d. gavage feeding (feeding by nasogastric or gastric tube) may be necessary in severely impeded feeding situations
e. in case of the Pierre-Robin syndrome, with advanced age (four to six years) catch-up growth will occur with improvement to independent feeding.

3. Problems affecting the swallowing process, which include frequent aspiration of food, as manifested by choking, coughing, and spitting up food, are sometimes found to be the cause of feeding difficulties.
Possible actions are:

a. evaluation of the swallowing process with special x-ray procedures such as the barium swallow with small amounts of liquid barium, Esophatrast® (this has a pudding consistency), a barium coated butter cookie or a barium hamburger. The preferred method is the cinefluorscopic or videofluoroscopic examination, which is not available in all hospitals or roentgenological institutes. Recently similar examinations have been done with ultrasound.
b. neurological examination if obvious deficits in motion are present
c. evaluation of which foods are better tolerated and are not as easily aspirated
d. provision of a training program for lip, mouth and tongue exercise, which will help the feeding problem (see Guide 13-2)
e. high caloric foods to maintain adequate nutritional intake if a low food intake persists (high caloric snacks of pudding consistency).

4. Immature oral development as manifested by sucking food down, clamping down on the spoon with the teeth, abnormal jaw and lip function, poor lip closure, limited chewing ability, severe tongue thrust, and poor food transfer, is a complex pattern of disturbance. These problems are often associated with poor head and trunk control.
   Possible actions are:
   a. pureed diet, in severe cases full liquid diet (see Guide 1-2)
   b. prolonged eating time
   c. positioning to improve head and trunk control (e.g., Mulholland positioning system, see Diagram 1 at end of Chapter)
   d. Mothercare spoons® or thick plastic coated spoons to prevent damage to the teeth if a strong bite reflex exists (see Resources, Chapter 18 and Diagram 13-1)
   e. oral motor control training program to improve lip and jaw functions. (See Guide 13-2)
   f. a special spoon feeding technique to decrease the severe tongue thrust, (see Guide 13-2).

5. Difficulties with hand activities can be manifested by paralysis or coordination difficulties and interfere with food preparation (e.g., opening of milk cartons, cutting meat, scooping food, etc.) and feeding.
   Possible actions are:
   a. adapted equipment to facilitate the feeding process, e.g., suction cups to stabilize the plate, plateguard with dycem or scoop trays, rocker knives, which permit one handed cutting and other equipment (help should be sought from an occupational therapist, see Diagrams 13-1 and 13-2)
   b. training in compensatory techniques to achieve adaption to one handed living, as it can be provided by an occupational therapist
   c. feeding of the severely handicapped, especially those with inability to use arms or hands, may be faacilitated by the use of an electric self-feeder (see Diagram 13-3).

Follow-up to a Successful Feeding Plan

The following components must be included to insure a successful program:

1. Communications directly with the parent or caretaker are necessary in order to transmit the recommendations made. Once this has taken place, a written report should be filed in the child's chart for reference purposes. In addition to the full written report, it is helpful to have a reference card placed for easy access within the dining room. This allows for the caretaker to refer to it. They should include the following information:
   a. position of child
   b. types of food
   c. primary feeding goals
   d. adaptive equipment
   e. communication priorities

If changes occur in the child's program, it is vital to communicate these verbally as well as in writing on reference cards to insure that all staff are aware of the changes.

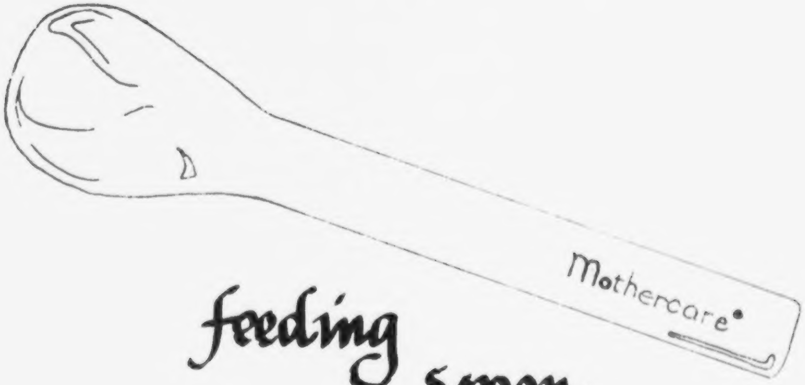
2. Assessment visits by the therapist to the parent or caregiver are extremely helpful to receive feedback concerning progress of the recommended feeding programs. This is an ideal time to re-evaluate the individual program and to make the necessary changes.

It is vital to the individual that all caregivers, including the family, work as a team in the area of feeding management. Constancy is one of the most important elements in a child's daily routine and is the key to success.

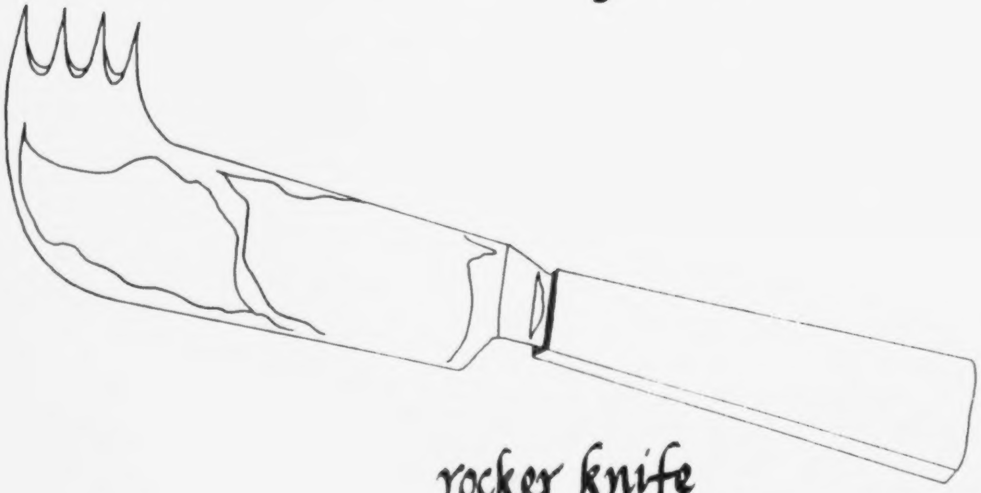
In many of the feeding problems, the question may arise if milk should be given or not. Since milk may increase mucus and saliva, the following liquids may be given to decrease mucus accumulation: warm water, tart juice, or fat free broth. Mouth exercises can also be used by the speech and occupational therapists to avoid mucus accumulation. It is important to note that milk should never be restricted to children unless there is a medically diagnosed intolerance or sensitivity. If this is medically necessary, then a calcium intake of at least 800 mg per day is recommended for children and adults, perhaps as a nutritional supplement. This requires attention to the necessary Vitamin D intake in order to assure adequate intake (see Chapter 3).

Many suggestions in this chapter have been proven to be effective. However, it is recognized that these programs are not instituted easily or rapidly. It may well be that access to many of the equipment items, professional input, etc., is limited. One has, therefore, to encourage teachers and parents to seek assistance from established programs or from the many publications that present specific, in-depth information about feeding programs (see Chapter 18 Resources). Following this chapter there are three diagrams of equipment used in feeding education programs.

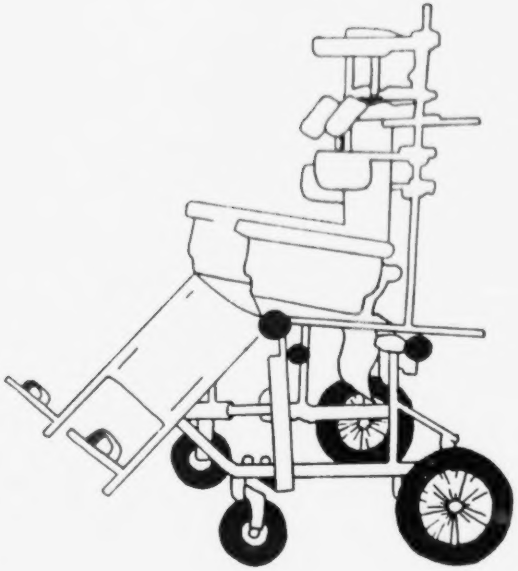
DIAGRAM 1.


Mothercare

feeding spoon

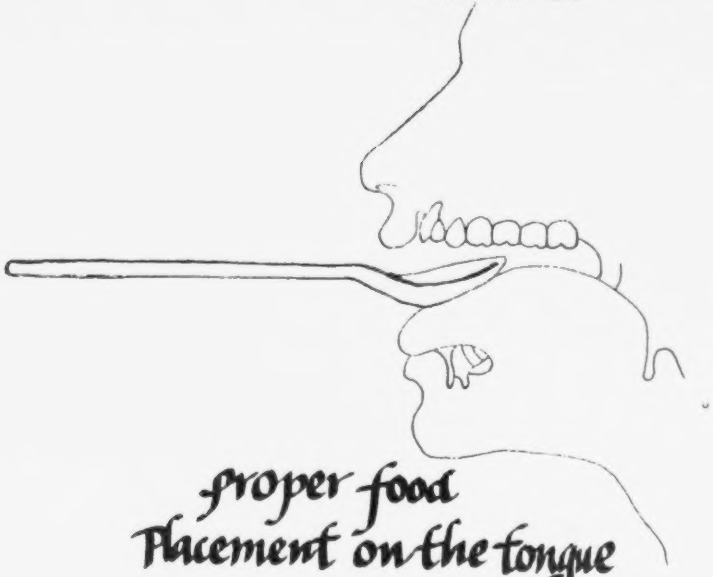


rocker knife and fork

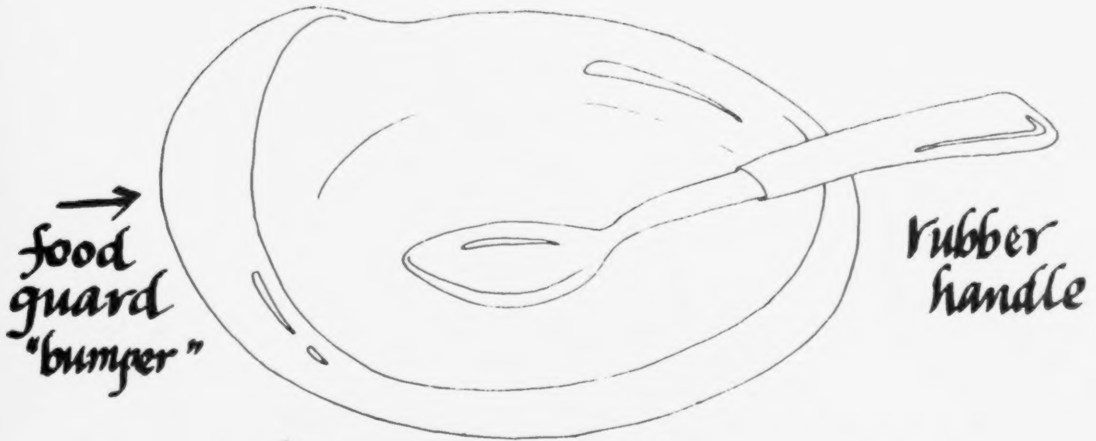


Mulholland Wheelchair

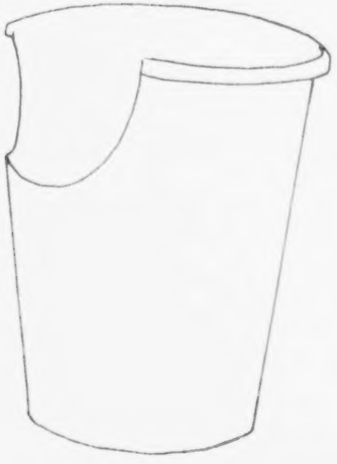
DIAGRAM 2.



proper food
Placement on the tongue


food
guard
"bumper"
rubber
handle

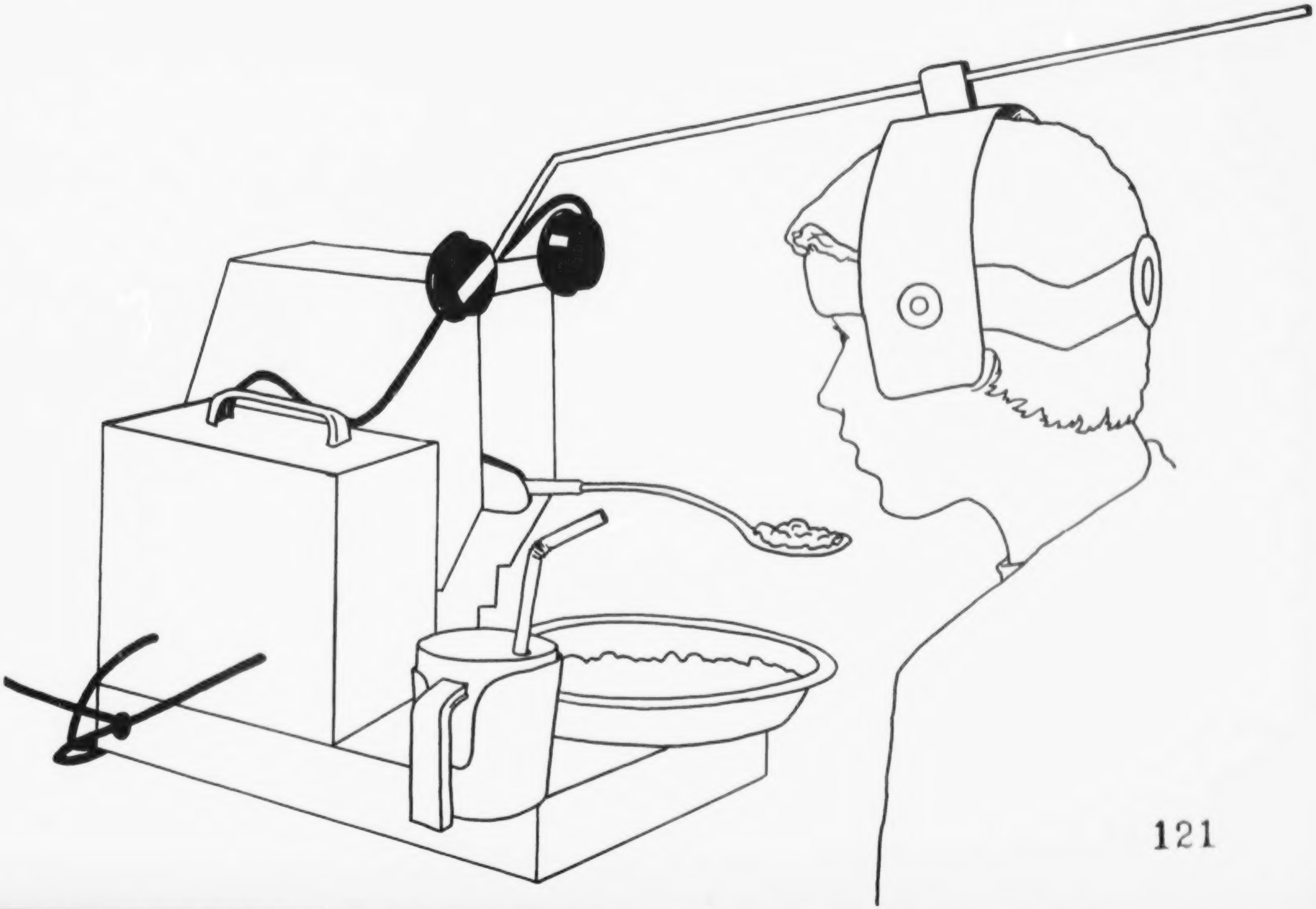
dinner plate with
food guard



drinking cup
(cut-out portion fits
over the nose)

DIAGRAM 3.

Electric Self-Feeder



GUIDE 13-1

FEEDING ASSESSMENT WORKSHEET (1)

NAME:
DATE:

Code: ✓ = if present
Date: above appropriate column on all pages

General Feeding Considerations

(Date)

1. Length of time of feeding
   15 minutes
   30 minutes
   45 minutes
   Longer period of time required

2. Position for feeding - optimum position for feeding is:
   1. Regular chair - Height:
   2. Adapted chair:
   3. Upright (90°) in regular wheelchair
   4. Upright (90°) in Mulholland
   5. Reclined (less than 15°) (15-75°) Circle one.

3. Types of food eaten
   1. Regular table foods
   2. Coarsely mashed - fruits/vegetables mashed with fork at the table
   3. Chopped - meats cut in small bite size pieces at the table
   4. Ground food - meats prepared in kitchen
   5. Pureed food - baby food consistency prepared in kitchen
   6. Liquids only
   Temperature/Taste and Other Considerations:

4. Amount of food eaten (Mark B for Breakfast; L for Lunch; S for Supper)
   Normal
   Less than normal
   More than normal
   Other:

Feeding Skill Assessment

1. Head and trunk control during feeding:
   Head control is adequate for feeding
   Head/Trunk control is adequate when in an adapted seating device
   Explain:
   Head is primarily held in a flexed position
   Head is primarily held in an extended position
   Trunk control is limited by flexor tone
   Trunk control is limited by extensor tone
   Unable to hold head in midline position
   Unstable trunk posture due to fluctuating muscle tone
   Other:

2. Oral motor development
   Suckling pattern (tongue flat and cupped, jaw and tongue act as unit, forward/backward tongue movement) (0-5/6 months)
   Rooting reflex - directed head turning to tactile stimuli around oral cavity (0-4 months)

Phasic-bite reflex - rhythmic series of small jaw openings and closing upon stimulation of the teeth or gums (0-5 or 6 months)
Tonic bite reflex - abnormally strong closure of the jaw upon stimulation of the teeth or gums - (always abnormal)
Other:

3 Oral sensitivity
Normal oral sensitivity
Hypoactive gag reflex
Hyperactive gag reflex
Resists changes in textures/temperatures of food
Increase in tone noted in response to physical touch to the face and neck area
Other:

4. Jaw Function
Mature rotary chewing pattern present
Inconsistent rotary chewing pattern
Controlled jaw movements limited to up/down motions (munch)
Demonstrates no purposeful chewing:

Can initiate controlled bite on all textures of food
Can initiate a controlled bite on soft texture food only
No purposeful bite

Normal jaw control
Jaw thrust pattern noted when biting and chewing
Jaw thrust pattern noted during spoon feeding
Jaw thrust pattern noted during cup drinking
Jaw thrust pattern noted in response to physical touch to facial area
Asymmetrical jaw movements noted during feeding
Other:

5. Lip Function
Normal lip control
Lips demonstrate abnormal protraction when being spoon fed
Lip retraction is observed when attempting lip closure around a spoon
Unable to achieve lip closure with a spoon
Unable to achieve lip closure during cup drinking
Unable to clean upper/lower lip (Circle)
No purposeful lip closure
Other.

6 Tongue Function:
Normal tongue control
Tongue lateralizes in one direction only (Side:)
Unable to lateralize tongue
Unable to elevate tongue to functionally remove food from palate
Tongue movements appear uncoordinated with lip and jaw movements when sucking/biting and/or chewing
Tongue thrust pattern observed
Tongue thrust pattern predominates
Tongue does not spontaneously change contour
Other.

7 Sucking
Able to achieve a normal sucking pattern
With facilitation techniques and/or adaptive equipment, displays appropriate sucking pattern
Unable to suck
Other.

8. Swallowing
Appears able to achieve a normal swallow reflex

Exhibits symptoms of possible swallowing dysfunction:
1. Pocketing of food between cheek and lower jaw
2. Collection of food in the anterior sulcus or beneath the tongue anteriorly or laterally
3. Collection of food on hard palate
4. Spitting food out of mouth
5. Slowed oral transit times
6. Excessive tongue movement
7. Delayed or absent elevation of the hyoid bone or thyroid cartilage
8. Coughing and choking
9. Gargly voice quality
10. Excessive copious secretions
11. Expectoration or regurgitation of material through the mouth or nose
12. It is felt a swallowing evaluation should be done
13. A swallowing evaluation was done on ______________________________

Exhibits a swallowing disorder radiographically:
1. Aspiration before the swallow due to poor tongue control
2. Delayed swallowing reflex
3. Absent swallowing reflex
4. Aspiration during the swallow
5. Aspiration after the swallow

Self Feeding Skills

Spoon feeding:
1. Totally independent for self-feeding
   Hand preference Right Left (Circle)
2. Spoon feeds independently but lacks coordination
   Specify:

3. Requires assistance and/or adaptive equipment for spoon feeding
   List:

4. Able to finger feed only
5. Can bring hand-to-mouth but displays inappropriate grasp patterns
6. Lacks functional upper extremity movement needed for self-feeding
   Other:

Drinking
1. Drinks from glass independently - 1 or 2 hands (Circle one)
2. Able to drink independently if using a straw
3. Unable to return glass to table
4. Able to grasp glass but requires assistance in bringing it to mouth
5. Able to drink from glass if glass is held for him/her
6. Able to drink from glass if glass is held for him/her and oral control is given
7. Other/Adaptive equipment:

Additional Comments

Communication Skills Utilized During Feeding:

Behavioral/Social Sills Utilized During Feeding:

Summary of Adaptive Equipment:

Developed by:

Crippled Children's Hospital & School, Sioux Falls, South Dakota

GUIDE 13-2

RECOMMENDATION FOR A TRAINING PROGRAM TO IMPROVE LIP AND JAW FUNCTION

1. This technique helps to guide the jaw and lip through normal movement patterns in order to improve feeding abilities.
   Place appropriate finger foods on the child's back molars to improve eating abilities. Also the use of a specially designed rubber cup that has a cut-out space for the nose may help the child drink more easily. (See diagram 2.)

2. This special spoon feeding technique can be used to prevent strong tongue thrust. When feeding with a spoon, place it behind the hump of the tongue with firm downward pressure to inhibit strong tongue thrust interference.

If the above measures do not improve the oral motor control or decrease tongue thrust, referral to a feeding and swallowing program should be made (see Resources Chapter 18).

Management of Inability to Self Feed

14

MANAGEMENT OF INABILITY TO SELF FEED

Inability to self feed is common among the developmentally disabled. The individual may be unable to finger feed or self feed due to numerous orthopedic problems. He may also be unwilling to feed himself even though he possesses the capability. This chapter will deal with proper positioning when feeding the child, appropriate diet, and possible solutions to behavioral problems that may occur at mealtime.

Feeding a disabled child can be a frustrating experience for both the child and the person feeding him. Because eating is necessary for the person's health, it is easy to lose sight of the fact that it should also be a pleasurable social experience. The atmosphere should be calm and pleasant. The caregiver should allow enough time for the meal and should talk to the child and not hurry through the meal.

Positioning

Proper positioning is necessary during feeding. If the person to be fed is placed in the correct position during eating, this lessens the danger of choking and aspiration, which is a constant threat to an individual eating in an abnormal position. The most favorable position for good eating is in an upright position, unless medically inadvisable, with the hips bent in a sitting position, the head in midline and arms bent at the elbows and close to the body. Feet should be placed firmly on a footrest.

Hyperextension of the neck makes swallowing difficult. If the child cannot be positioned in this manner it may be necessary to control the neck region by providing manual support. Place the left arm around the back of the neck. Then place the left thumb on the child's cheek, the index finger under the lower lip; the third finger under the chin and the little finger either on the neck or chestline. This position allows for proper positioning of the head and also for manipulation of the jaws and lips. Without head control, it is difficult for the child to keep his mouth closed and swallow.

Abnormal Reactions

Special techniques may be needed if the child has abnormal reactions that interfere with feeding. If the child has a startled response, characterized by fluttering eye lashes, or turning away or withdrawing of the head, try to get the person's attention and assure that he is following your hand as it approaches with the spoon.

To decrease a strong bite reflex use a generalized stroking and patting of the face and firm but gentle rubbing of the gums. A plastic coated spoon or a Mothercare® feeding spoon, of appropriate size, should be used during feeding.

Adaptive drinking devices may be used for the child who has a problem retaining fluid due to poor lip closure. Use spout cups to control the amount of fluid the child is receiving. Cutout cups or nose glasses can also be used (see Diagram 2, Page 88). They enable the caregiver to see the amount of liquid the child is receiving.

Food Texture

Good technique with the wrong diet is equally ineffective as poor technique with the right diet. The texture of the diet is very important and must be adapted to meet the needs of the person. There are several ways to modify the consistency of a diet for the handicapped person. A modification in consistency simply means the food is altered by blending, grinding, mashing or chopping the food. The appearance may change, but the flavor and nutrient content remains the same.

The pureed diet consists of foods that are smoothly blended with the exception of moist cakes and cookies that may be easily soaked with milk. The ground diet consists of foods that are finely ground. A full-liquid semi-solid diet (see Guide 1-2) is used with the child that is learning to chew. This diet has ground food and includes soft fruits and vegetables that are easily chewed. A chopped ground meat diet consists of regular chopped food with ground meat. This diet is for the child who is able to chew, but needs his food "chopped" into bite size pieces.

It is important to note that some children, due to severe handicapping conditions, may never progress beyond pureed foods. Each child must be assessed to determine whether it is possible to progress to another type of diet. The person on a pureed diet usually cannot chew and has problems with swallowing. This food has the consistency of baby food. It is sometimes necessary to liquify the food further to facilitate swallowing.

The next step is a ground diet which is used with the person who cannot chew but is able to swallow. The progression should be made gradually, introducing one food item at a time, as the child may refuse the change in texture. The diet continues to progress as the child's ability to chew and swallow develops. Providing food that requires chewing is one of the best teaching methods (e.g., sweet foods such as cookies or soft fruits tend to increase saliva production and make swallowing easier).

At this point, chewable foods are introduced to the diet and the progression continues. As the child improves chewing skills, advancing from hinge chewing to rotary chewing and taking time to chew, the diet is advanced to a chopped consistency. Teaching must accompany the progression in diet, since chewing is not a reflex, but a learned skill.

Aspiration

A child may have more severe problems that affect it's ability to eat, and thereby, nutritional status. Aspiration of food particles into the lung can lead to aspiration pneumonia. The severely and profoundly handicapped child may not be aware that he is aspirating and continues to eat. Aspiration is the result of an abnormal swallowing process or poor tongue control before the food is swallowed. One method of studying the swallow is by means of videofluoroscopy or cinefluoroscopy. The swallow is recorded on video tape or movie film and allows for the study of the swallowing process frame by frame. One is then able to analyze the swallowing difficulties. However, being expensive, time consuming, and not readily available, it may not be necessary for each person (see Chapter 13).

After assessing the child, one needs to make recommendations regarding feeding. In general, if the person is aspirating more than 10% of the food he should not be fed orally. A physician needs to make the decision whether to feed via nasogastric tube or gastrostomy tube. A nasogastric tube is a narrow tube that is passed through the nose, pharynx and esophagus into the stomach. Food is passed through the tube into the stomach periodically throughout the day. Each feeding is followed by water to clean the tube and to ensure the child is getting enough fluid. The disadvantages of the nasogastric tube are discomfort to the person, the possibility of regurgitating and aspirating the food, and the expense of formula diets. The nasogastric tube is usually a temporary measure. For long term use, the gastrostomy is utilized. The gastrostomy is a surgical procedure that makes an opening from the abdomen to the stomach. A soft tube is inserted and table food can be fed through the tube. It is more comfortable than the nasogastric tube, and the surgical procedure can be reversed if the person is able to be fed by mouth at a later time.

Self Feeding

When a child has a developed ability to chew and swallow, he should be assessed for ability to self feed. The consistency of the diet must be such that it can stay on the spoon. It would be difficult to self feed on a pureed diet. The child who is able to self feed but unwilling to do so presents another problem to the caregiver.

Unwillingness to eat is often encountered with the severely and profoundly handicapped, particularly with those who possess multiple orthopedic impairments. For the purpose of this chapter, unwillingness to eat is viewed as a voluntary form of resistance to the mealtime process complicated by, but not the direct result of, a physical disability. In other words, the person who is "unwilling" to eat possesses all the prerequisite skills to self feed, but voluntarily chooses not to do so at meal time. The teacher, trainer, or parent must engage in a process that will decrease the occurrence of any undesirable or inappropriate behaviors during mealtime and increase desired and appropriate behaviors.

Voluntary behaviors increase in frequency when a desired outcome or consequence is available, and decrease in frequency when an undesired outcome is the result. Therefore the trainer must find out what things the developmentally disabled person likes (reinforcers) and provide those reinforcers contingent upon the occurrence of the desired behaviors, and withhold them in the presence of the undesired behaviors. In all cases, the more immediate a consequence ensues, the more likely it will affect the behavior it follows. The use of adaptive equipment and therapeutic positioning is a prerequisite to all feeding programs.

Finding out what the disabled person likes can be done in several ways. The first method involves using unstructured and open ended interviews with individuals who know the person. Parents, teachers, and direct care staff may produce valuable information about the person's likes and dislikes. Another method involves developing a list of potential reinforcers and presenting this list to individuals familiar with the child so that they might select from these potential reinforcers those items they think the child might like best. The list of potential reinforcers is generally based on some prior knowledge of the child, or acquired from other lists of reinforcers that have been demonstrated effective with other individuals with similar disabilities and settings. The last method involves direct observation of the child for a period of time. As a general rule of thumb, any activity in which the person frequently engages may be a potential reinforcer.

Once potential reinforcers have been identified, the next step is the specification of the mealtime behavior to be either increased or decreased. The term "unwilling" to eat is non-specific. Many behaviors might be placed under the general category of "unwilling." For the purpose of this chapter we will list several specific behaviors that might be included in this category and then discuss potential solutions for each.

Two items have been demonstrated effectively with disabled persons to be used as reinforcers in dealing with behaviors labeled "unwilling": attention from others and music. Food items are frequently listed as potential reinforcers for many developmentally disabled, but the use of food as a reinforcer for the development of appropriate mealtime behaviors has several drawbacks. First, food cannot be completely withheld for a lengthy period of time while waiting for the appropriate behavior to occur. Second, in most institutional settings and many schools there are ethical and legal considerations that make it impossible to use food as a contingent reinforcer, and finally, this can lead to an inadequate diet (high in sugars) and obesity.

The category "unwilling" can be divided into two modes: passive and active. Persons who are passively unwilling, or resistive to eating, might engage in behaviors such as holding food in mouth, not swallowing, refusing to grasp spoon (even though they are able to grasp), refusing to scoop food onto spoon, and eating at a very slow rate. Active unwillingness, or resistance, to eating might include such behaviors as refusal to open mouth, throwing the spoon or food, and spitting. Another behavior that might be included under active resistance is voluntary or self induced vomiting and rumination (see Chapter 11).

Specific Problems

Holding food in mouth and not swallowing.

Advice: Use attention as a reinforcer for swallowing. Front finger control (thumb on chin, forefinger on bottom of cheek and middle finger under chin) may assist in biting and swallowing. As soon as the swallow of food occurs, praise the person, give him or her a pat on the head or a hug. Say how happy you are when he or she is eating well. Give the person another spoonful of food. Once again use front finger control and praise when swallowing occurs. If attention in the form of praise and hugs is a reinforcer, the person should soon begin chewing and swallowing without assistance.

Will not hold spoon.

Advice: Use music as a reinforcer for holding onto the spoon. Pick a cassette tape of music the person seems to enjoy and place it in a small portable cassette player. Start the music and place a spoon into the child's hand. If the child drops the spoon, turn off the music. Wait 5 to 10 seconds. Do not talk to the child during this time. Place the spoon back into the child's hand and turn the music back on. Repeat this procedure. This solution may be practiced at times other than meals. If the music you selected is reinforcing, the child will begin holding the spoon for longer periods of time. Eventually, the child should be holding the spoon throughout the entire meal.

Advice: Use an adaptive spoon and music as a reinforcer. Use a spoon adapted with a velcro strap holder so that once placed onto the child's hand, the spoon cannot be dropped. Start the cassette recorded music. At five minute intervals during the meal take the velcro spoon out of the hand of the child for 10 to 15 seconds and turn off the music. If the music you selected is a reinforcer the child will begin to learn that when the spoon is in his or her hand the music will play. Do not speak to the child when the music is turned off. After 10 to 15 seconds, place the spoon back into the child's hand and turn the music back on. Continue with the meal in this fashion.

Person is a slow eater.

Advice: Inform the person that he or she has only a fixed amount of time in which to finish the meal. Place a kitchen timer in front of the person and set it for 20 to 30 minutes. At the end of time period remove the person's food tray and any uneaten food. Do not return the food. Do not give the person any between meal supplement other than milk, juice or water. This program should be attempted only after a thorough medical evaluation of the person. This program should be terminated if the person loses weight or upon a physician's decision. A person is more likely to eat when he feels hungry, and is more likely to be hungry when a meal is missed because the blood sugar stays low. Therefore, the person will learn that the feeling of hunger can be avoided only by eating the meal and that the meal will be available for only a fixed period of time. Praise the person highly on those occasions when the meal is consumed within the time period.

Child has frequent vomiting or rumination.

Advice: Use attention as a reinforcer for every five minutes the child has not thrown up food into his or her mouth or expelled the partially digested food out of the mouth, and apply a consequence the child does not like when vomiting occurs. Praise the child every five minutes that vomiting has not occured. Whenever vomiting occurs, apply Listerine® to the inside of the mouth of the child for one minute using an antiseptic swab stick. There is a twofold action: it cleans the mouth area of bacteria while reducing the odor of the vomitus and has an aversive consequence thereby decreasing an undesirable behavior. Since this procedure involves an aversive consequence, consent from parents or guardians must be obtained.

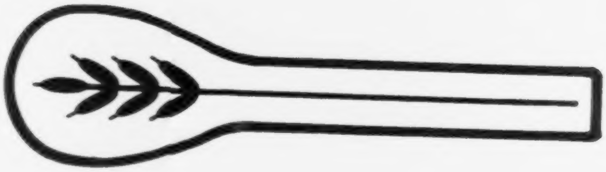
Child throws spoon.

Advice: Block the behavior from occurring by the use of music and attention. Place your hand gently over the child's hand and guide him or her through scooping food. Whenever the child attempts to throw or discard the spoon, block the movement with your own hand. Allow the music to remain on and continue to talk to and praise the child as long as he or she is not trying to throw the spoon. If the child is strong and able to throw the spoon in spite of the best blocking efforts, use an adapted spoon with a velcro strap so that the child cannot release the spoon.

Person spits food.

Advice: Reinforce person for not spitting by using attention or music as a reinforcer, and apply the oral hygiene procedure listed previously if spitting persists. Begin the meal and turn on music. Sit beside or stand near person and praise him or her as long as spitting does not occur. Turn off the music and do not talk to the person for 10 to 15 seconds each time he or she spits during the meal. If the music selected and the individual attention is reinforcing to the person, spitting will decrease during the meal. If spitting continues, use attention and music as reinforcers and apply the oral antiseptic such as Listerine®, for one minute each time the person spits during the meal. Begin to decrease the amount of praise and attention you give as soon as spitting decreases to an acceptable level or disappears entirely.

Feeding the disabled person should be a pleasant experience for the caregiver and the individual. If feeding is unpleasant due to feeding problems that cannot be overcome by changing position, technique or diet, a non-oral feeding may be a solution for this person.



Abnormal Mealtime Behavior

15

ABNORMAL MEALTIME BEHAVIORS
(Disruption, Hyperactivity, and Short Attention Span)

Proper feeding and nutrition may be difficult to obtain when children present problem behaviors during mealtime. Children who are hyperactive or have attention deficits can rarely finish a meal. Disruptive behavior such as tantrums or aggression become so aversive to others that they may cut the feeding time short. Abnormal mealtime behaviors are not only detrimental to the child, but they can also make life miserable for others. Many annoying mealtime behaviors can be tolerated. Others can begin inconspicuously and gradually escalate out of control. This section outlines some general procedures that have successfully improved abnormal mealtime behavior in many children. It is important to keep in mind that not all behaviors need changing, and that those that do cannot all be successfully treated with the methods outlined here.

Mealtime behaviors should be viewed as any other type of behaviors, namely functional. That is, in order to remedy the problem behavior, one must first look at the purpose the behavior serves. When that is understood there is a good chance to successfully change the behavior.

Common Problems

While behavior of every individual is unique, there are some common themes.

1. Attention
   Getting ones attention, positively or negatively, is probably the most common outcome of problem behaviors. A scolding is sometimes just as rewarding as sincere approval. In many cases a response occurs more reliably after poor behavior. It is therefore little wonder why negative behaviors persist over time.

2. Escape or Avoidance
   Children often misbehave in order to get out of certain demands or expectations. Mealtime has many such demands. Children are expected to sit quietly for long periods of time. This is often difficult especially for children who are hyperactive or who have short attention spans. The taste of certain foods, too, can be aversive. Spilling milk, excessive noise, and self-stimulatory behaviors are often effective ways to get excused from the table and thus escape certain expectations.

3. Winning
   Many times when peers or siblings are expected to spend extended periods of time in close proximity, problems are bound to occur. Sitting around the dinner or cafeteria table until everyone is excused can be difficult and lead to problems. The child who yells the loudest or nags the longest often gets his way. Such negative reinforcements let the child perceive that his behavior is successful in the end.

4. Frustration
   Some behaviors do not appear to be goal or outcome directed. Some

just seem like spontaneous responses to frustrating situations. Trying to teach a child the correct use of utensils, to slow down between bites, or other expectations they find difficult to achieve are common frustrating situations. When a fork flies across the room, a plate is swept from the table or body rocking increases, it may simply be due to an inability to handle stress and frustration.

Any behavior change attempt is only as good as the assessment that precedes the attempt. The assessment is most useful in determining what approach to take if it provides information about the function of the behavior. Clinical interventions developed and carried out without regard to why the behavior occurs are ineffective or possibly detrimental. It is beyond the scope of this chapter to be a guide for dealing with all the various maladaptive mealtime behaviors, especially since every behavior can serve a different purpose. Though the problems mentioned above represent some of the more common types of behavior, they are by no means complete. Many parent-child or teacher-child interactions, however, have some similarities. This is the case whether the interactions center around mealtime or occur under other conditions.

Furthermore, many problem behaviors are related to noncompliance. That is, if the child would comply with commands to stop rocking, to use a fork or quiet down, behavior problems would certainly be minimized. Therefore, the rest of this section will be devoted to identifying a few typical maladaptive interactions, and describing a general approach to increase compliance during mealtime by altering those interactions.

Management

Many abnormal behaviors are not only the child's problem. Just as parents or teachers can help a child's social development, they can also unwittingly foster maladaptive behavior. One seldom recognizes the impact they have each time they interact with children. If every interaction is a learning experience, and there are thousands of interactions within a short time, it is not difficult to understand how minor nuisances can grow into extreme abnormal behaviors over time.

The development and maintenance of deviant child behaviors are not only strengthened by escaping or getting out of demand situations, but a parent or teacher may also encourage noncompliance with their attention. For example, coaxing or trying to reason with the child when he refuses to eat his peas may only increase his noncompliant or maladaptive behavior. While this may be successful on a short term basis, in the long run the parents may find themselves doing more and more coaxing each and every time they make a request. This is just the start of what could be a long and gradual development of highly disruptive behaviors.

These patterns of interaction are some of the most common with regard to abnormal behavior. Even though demands may not be so obviously stated, many problem behaviors are responses to some form of demand situation. There are many instances in which demands are implied. Mealtime is one such situation. More often than not, the child does not have to be told to pick up his fork, to sit quietly or to clean his plate in order to know how to behave properly at the table. Mealtime has many implicit demands, and the whole setting may serve as an antecedent for many problem behaviors.

There is a brochure available for helping parents handle inappropriate mealtime behaviors (see Resources, Chapter 18). While it does not include all behaviors and all the various functions that problem behavior can serve, it is a good first step which focuses mostly on behaviors typically following one or more of the above mentioned functions. The first step in the mealtime package is for the parents to fill out the Mealtime Behavior Checklist (see Guide 15-1). This helps the parents identify and recognize the specific behaviors that are most problematic. It can also serve as a buffer to keep the parent from becoming too punitive. In other words, by dealing only with the behavior on the checklist, the tendency to generalize and to suppress all of the child's inappropriate behavior at one time may be reduced. In order to correct a child's inappropriate mealtime behavior, it is important that one decides which specific behaviors they wish to change first.

The parent's or caregiver's attention to the child is very important. Children quickly learn that they receive attention for some things they do. These behaviors are the ones that a child will do again and again. Therefore, it is important that one give attention to the child only when the child is behaving correctly at the table. There are two primary ways in which a person should respond positively:

1. Praise the child acting appropriately at the table (e.g., "You're such a good boy or girl for eating your food!"). For further information, see Guide 15-2 for some more praise statements.

2. Give physical rewards such as a hug, kiss, pat, stars, stickers, and so forth.

These two types of positive attention from a parent or teacher, especially the praise, are very important in helping good behavior get started and in maintaining this good behavior once it has begun.

Initially, it is important to praise a child quite often when he or she is acting appropriately at the table. Therefore, for the first week during a meal one should praise the child at least once every minute, or more frequently, when the child has acted appropriately. During the next week, one might praise the child a little less often. Never phase out praise statements completely. Always praise the child several times during every meal when he is being good.

One of the best ways to establish a good relationship with a child and to eliminate the child's bad behavior at the table is by rewarding him or her for being good. However, there are times when one may need to actively stop this bad behavior. In order to implement the following procedure, it is necessary that a person use a quiet room, such as a bathroom or bedroom, where one can place a child when he or she misbehaves at the table. The room should contain as few fun things (such as magazines, toys, TV) as possible. Furthermore, there should not be any dangerous items like sharp objects and medicine in the room. For active intervention of bad table behavior, see Guide 15-3.

GUIDE 15-1

MEALTIME BEHAVIOR CHECKLIST

I. Inappropriate Eating Behaviors

__________1. Spilling food onto the table and/or floor on purpose
__________2. Eating food spilled on the table, floor, or clothing
__________3. Eating food by placing mouth directly on it (without use of fingers or utensils)
__________4. Eating too fast (not pausing between bites)
__________5. Putting too much food in mouth, such that chewing cannot be done with the mouth closed
__________6. Playing with food (e.g., patting gelatin or pudding with hands, smearing food)
__________7. Eating food with fingers (excepting use of fingers to hold foods properly eaten with fingers, e.g., sandwiches, potato chips, etc.)
__________8. Removing food from the mouth (spitting out or using fingers)
__________9. Using fingers to place food on utensil
__________10. Others:

II. Misconduct

__________1. Not coming to the table when called
__________2. Standing up or leaving table before end of meal
__________3. Stealing food or other objects at the table
__________4. Throwing or banging utensils
__________5. Throwing food
__________6. Pushing the table
__________7. Rocking or moving the chair (other than to sit down or leave the table
__________8. Placing a foot on the table
__________9. Placing head on the table
__________10. Placing a foot on others or their chairs, or kicking them
__________11. Hitting others at the table
__________12. Whining or crying
__________13. Screaming or yelling
__________14. Others:

GUIDE 15-2

PRAISE STATEMENTS

1. "I really like it when you eat so nicely."
2. "You are such a big boy (or girl) to eat your food."
3. "Thank you for behaving so well at the table."
4. "I'm so proud of you--you're acting just like a grown-up."
5. "I like it when you stay at the table for Mom."
6. "You have such good manners--that's great."
7. "Thank you." "You're so nice!" "Good!"

These are just a few of some praise statements you can make to reward a child for good mealtime behavior. One should not be afraid to use other statements of praise.

GUIDE 15-3

PRACTICAL STEPS OF ACTIVE INTERVENTION OF POOR MEALTIME BEHAVIOR

Use the following procedures when your child misbehaves at the table.

1. Tell the child to stop misbehaving, provided that he understands what he is asked. Be sure to name the bad behavior. Tell the child only once, and make statements as brief as possible. For example, say, "(Child's name), stop throwing food right now!" If he complies (e.g., stops throwing food), reward the child. For example, say, "That's a good boy (or girl) for doing what Mom asks you to do."

2. If the child does not comply immediately or complies for a moment and then does the same behavior again (say within 5 seconds), immediately take the child firmly by the hand and lead him to the quiet room, and while placing him in the quiet room say, "You didn't do what I said, so you have to stay in here." Be sure not to talk to the child at any time during this procedure. One doesn't owe the child any additional explanations.

3. Then close the door and hold it if necessary to keep the child in the room. Leave the child in the quiet room for three minutes, but be sure to wait until he has quit crying, fussing, or yelling for 15 seconds at the end of the three minute period before taking him out. It is important that one does not respond in any way (such as talking to the child) while the child is in the room.

4. When taking the child out, open the door and say, "Now we will finish eating."

5. As soon as the child is acting appropriately at the table, praise him for the good table behavior.

6. If a child begins to act inappropriately at the table again, follow the above procedure, even if one has just brought him back to the table.

At first, one will find these procedures difficult to implement. Once a child realizes that a person is going to be consistent and will not tolerate bad behavior at the table, and that one will reward good behavior, life will be much easier at mealtime and everyone will enjoy the child more during mealtime.

Oral-Dental Health for the Developmentally Disabled

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ORAL-DENTAL HEALTH FOR THE DEVELOPMENTALLY DISABLED

Dental care is probably the greatest unmet health need of handicapped persons. It is the one health problem that affects nearly all of them. Oral health is often overlooked because of other immediate medical needs. A healthy mouth however, means that all nutrients taken into the body can be chewed, mixed with saliva and swallowed properly, constituting the first step in digestion. It makes mealtimes into an enjoyable time of the day. Healthy teeth and surrounding tissues aid in the proper development of speech, and a healthy mouth means an acceptable smile. This translates into a better self-image, more confidence, and greater social acceptability. Good oral-dental health is vital for optimal health and necessary for all people to reach the maximum of their potential and ability.

Of significance to all people, but especially important to the developmentally disabled person, is the fact that dental disease is preventable and treatable. The three primary causes of disease in the mouth are plaque formation, tooth susceptibility and sugar consumption. All three can be controlled or corrected by proper home care, professional treatment, and prudent nutrition. Factors such as long-term pureed or soft dietary intake, medication side effects, problems in coordination, greater tendency to injury, bite reflex and abnormal tooth placement, are challenges that can be met and dealt with, but action ought to be taken early.

Environmental Problems

The average American consumes 128-130 pounds of sugar a year, according to government statistics. Some comes from the sugar bowl on the table, but most is from processed food products: candy, cupcakes, ketchup, canned peas, etc. And more than 20 pounds of that sugar total is in soft drinks. An average person drinks 295 cans a year. Much of this high sugar intake is also related to hidden sugars in many foods. Refer to Guides 16-1 and 16-2 for a listing of high sugar containing foods.

This serious situation is compounded for the developmentally disabled. Society tends to equate candy and sweetened food with the expression of love. Food, and especially sugar are known to be powerful reinforcers and motivators for human behavior. This results in candy and other high sugar foods being used in great quantities and routinely as treats for the developmentally disabled person, especially children. The American Dental Association states that "eating excessive amounts of carbohydrates, especially sugar, is an invitation to dental disease." If sugar rich snacks (candy, sugar containing pop and chewing gum, etc.) are consumed 6 to 12 times a day, the acid attack on the teeth continues for 6 to 12 hours. The irritation process to the gum tissue is likewise continued.

Supplying adequate fluoride in the diet or drinking water is helpful in strengthening the teeth during development and preventing cavities throughout life. Fluoride, incorporated in the structure of the growing tooth, will actually build stronger, more acid resistant tooth enamel. After the teeth are erupted, fluoride toothpaste, fluoride rinses, and professionally applied fluoride treatments can continue the strengthening process. This is a critical factor because the susceptibility of the teeth to the acid attack of plaque may be increased due to malformation of the tooth structure (hypoplasia) frequent among developmentally disabled persons.

Finally, some developmentally disabled persons may have tooth supporting tissues that are especially susceptible to breakdown when attacked by bacterial laden plaque and the acidic by-products, (e.g., persons with Down syndrome who also frequently exhibit late, irregular, or incomplete tooth formation). Prader-Willi syndrome children appear to have a very high incidence of dental caries in comparison to other developmental disabilities. Others, such as those taking hydantoin for seizure control may have gum tissue that exhibits an exaggerated repair response to the attack producing gingival hyperplasia (overgrown gum tissue). Complicating factors for oral-dental diseases include mouth breathing habits, malocclusion, teeth grinding (bruxism), inability to accomplish daily oral hygiene and to obtain the necessary dental treatment.

Prevention Rather Than Cure

"An ounce of prevention is worth a pound of cure." This old adage is also appropriate for oral-dental diseases. The idea is to stop dental disease before it happens. This can be accomplished only on a basis of good information and appropriate action. Guide 16-1 provides a summary of the signals that may indicate oral-dental health or disease.

General Dental and Gum Care

At birth, the child's first set of teeth are already formed in the jaw bone. The first tooth will grow into place in the mouth usually between five to seven months. For developmental disabilities diagnosed at birth or shortly thereafter, a plan of care should be developed as early as possible. Because dental problems are certain to occur, preventive dental care should be included.

As soon as the first tooth erupts through the gum tissue, plaque (a sticky mass) will form on it. Therefore, it is important to begin the habit of toothbrushing at this time. A very tiny toothbrush with soft nylon bristles is most appropriate for use. You may hold the infant (or the child until size prevents) on your lap, facing away from you, cradling his/her head in your arms. Gently part the lips with your clean fingers and brush all the teeth present (see later in this chapter for technique). Children should never be put to bed with a milk or juice filled bottle since the sugars in the juice and milk are factors in dental destruction. If a child has just consumed milk, and brushing is not possible, the mouth should be wiped out with a clean, white, and damp cloth. Children will need direct assistance until the age of seven or eight years (chronologically and developmentally). The most important time for brushing the teeth is just before bedtime. The saliva flow is greatly reduced during sleep and if plaque is left on the teeth, the acid attack can be prolonged through the night. If the child has to take medicine, give it first and then brush the teeth, since many medicines contain sugar to make them more palatable. It is important also to brush or wipe the teeth after each dose of sweetened medication, especially at bedtime.

Fluoridation

The teeth can be strengthened against decay through the appropriate use of fluoride. For the ideal result, fluoride should be at a concentration of one part to a million parts of water (1 ppm). Many communities adjust the level of fluoride in their water supply to achieve this optimal level. The local dentist can be contacted for information on the level of local fluoridation. Where fluoride levels are not known, an analysis can be done (for resource listing see Chapter 18). If fluoride levels are not up to the recommended levels, fluoride supplements can be prescribed in liquid form to infants and chewable tablets for the older child to gain the benefits desired. In areas having adequate fluoride in the water supply, supplements need not be taken. Although the teeth would be hardened and more resistent to decay, there is the likelihood of discoloration at levels higher than recommended.

Regardless of water and supplemental fluoride levels, a fluoride toothpaste is important. It will not cause discoloration of the teeth even in areas with water containing high levels of fluoride or in cases of fluoride supplementation. In addition to the tooth strengthening benefit from fluoride, there is also a suppression in the growth and activity of the harmful bacteria in the plaque by direct contact with the fluoride paste and solutions. But the primary means of fighting against the plaque bacteria is the toothbrush.

Tooth Brushing Techniques

A pea-sized amount of toothpaste is applied to the brush. This can be done at the earliest age. By brushing the teeth the paste coats the teeth with fluoride. With this small amount of paste, there will not be a great excess of foaming and since the child has not mastered the process of spitting, the paste can be left in the mouth. This may actually enhance the benefit by prolonging the fluoride paste to tooth contact. It also means that toothbrushing can be done at any place, any time, and not restricted to the availability of water. As the child grows, the personal toothbrush provided will familiarize him with its use and the feel of it in his mouth. A soft tooth brush is also a good tool to increase a child's oral and facial tactile awareness.

The use of dental floss is important to gain access to the areas of tight contact between the teeth. Often though, developmentally disabled persons have a difficult time flossing. Persistence and patience is essential, and must be on-going. A thorough toothbrushing and flossing program can take from three to five minutes or longer each time, depending on the age, cooperation, ability of the child, and the number of teeth. There are up to 20 teeth for the young child (two to three years old) and 32 teeth in the young adult (20-22 years old).

If the complete regimen can be accomplished once a day, preferably at bedtime great benefit will be attained. If it can be expanded, even in part, to follow meals during the day, additional gains can be made. If proper self dental care is not possible for the developmentally

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disabled child or adult, it is recommended that the teeth be professionally cleaned and polished every two weeks. Practically speaking, the employment of the best in self care and helping care on a daily basis at home and school along with quarterly professional care, can result in the greatest possible benefits in health of the mouth for most people, and especially for the person with a developmental disability.

Injury to Mouth and Teeth

To the general population and especially to developmentally disabled persons, accidents or trauma involving the mouth and teeth occur quite often. It does not take great force to produce a wound inside the mouth, to chip or crack the teeth or even to break the jaw. A proper examination by a dentist should be done following any oral trauma. In that way, something not visible or not communicated by a non-verbal handicapped person can be discovered and treated quickly. If a tooth is knocked out in a fall, it should be wrapped in a wet paper towel or washcloth, or placed in a cup of water or carton of milk. No attempt to clean the tooth should be made nor should it be allowed to dry out. The individual and tooth should be taken to the dentist immediately, if possible, within one hour. The tooth can then be reimplanted in its proper place and splinted to hold it for a few weeks. The splint can then be removed and the natural tooth remains in its place. This treatment is successful most of the time.

Dental Damage Due to Vomiting

Damage to the teeth from the acidic contents of the stomach being vomited, regurgitated or ruminated can be a problem found among the developmentally disabled. The stomach content, when stimulated, is highly acid. Even with dilution by food, drink, and saliva it can easily reach critical ranges which cause erosion of the enamel of the teeth. Careful diagnosis as to the cause in each individual must determine the physical or psychological (bulimia, bulimarexia) nature of the phenomenon and appropriate treatment must be instituted. Meanwhile the teeth can be severely damaged and if the cause is not successfully treated, the teeth can be destroyed. For specific discussion of further aspects of these problems see Chapter 11.

Other efforts to slow or prevent damages are the application of topical fluoride gels or solutions to the teeth in order to counter the acid attack. The frequency and strength of the fluoride treatment should be determined on an individual basis. If the vomiting, regurgitation, or rumination persists, a bicarbonate solution may be necessary to neutralize the acid level immediately after the exposure. Fluoride treatment should follow. Care should be taken so that the neutralizing, preventive, and repair treatments do not become reinforcers for the aberrant behavior. Coordination between psychologist, physician, dentist, registered dietitian, teacher and parent to assure adequate nutrition is vital for successful management of this complex problem.

Dentures

Even when many teeth or all teeth have been lost, a dentist working with an occupational therapist, a registered dietitian, a speech therapist and other professionals can provide partial or complete dentures in order to restore some of the function and much of the esthetics so vital to physical and psychological well being. Since some developmentally disabled individuals manifest behavior disorders as well, treatments previously unavailable to them are now provided because of improved materials, techniques, and a greater number of dentists who have received training and experience in such care (see Chapter 18 Resources).

Nutrition and Dental Health

For reasons other than those of oral-dental health, nutritious food is worth the effort of self-discipline and intelligent choice. Parents, educators, food service staff, and medical consultants should always provide a good example for dental health and correct food choices. Of utmost importance for this goal is the reading of food product labels. If sugar (e.g., sucrose, glucose, fructose, corn sweeteners, etc.) is anywhere near the top of the list of ingredients, then true benefit for that product may be lacking and a more appropriate selection is indicated. Foods high in sugar content increase the bacterial attack on the mouth tissues and teeth. There are also a number of foods that prevent or neutralize the acid attack of the bacterial plaque. Guides 16-1 and 16-2 list a few examples of foods in these contrasting categories.

It is not practical to suggest the exclusion of most high sugar foods from the diet, but it is rational to expect choices to be made based on knowledge and discipline. Most of the foods on the safe list do not cause harm to the body, but actually provide protection to the mouth. Cheese contributes calcium and phosphates to the plaque on the teeth which could reduce decay. Cheese acts as a powerful agent by entering the plaque, protecting against acid formation, and acting as a saliva stimulant. If eaten immediately after sugar, cheese almost completely prevents the acid destruction of the teeth. This being the case, cheese reduces the dental disease produced by sugar and bacteria in the mouth.

Food selection and eating is a social activity as well as a science. Both aspects can be incorporated into habits that are nutritious and developmentally appropriate. Parents, health and dietary professionals, teachers and others can be influential as role models and food providers. Through that opportunity they can offer learning experiences that assist the developmentally disabled person to develop self control, to live with good decisions, to develop good feelings about himself, and to develop sound nutritional concepts as the basis for selecting diets which will enhance both mouth and general health.

Team Effort In Preventing Dental Problems

The dentist, dental hygienist, parents, registered dietitian, teacher, physician or the individual, acting alone cannot achieve the desirable goal of a state of maximum health. It requires a coordinated team effort, based on intelligent decisions, and carried out with determination in order to progress along the path of life and to avoid oral-dental disease and destruction. When proper attention is paid and appropriate effort is made in daily oral hygiene, food selection, and periodic professional care there will be more time and opportunity to enjoy mealtimes and contact with other people and the world in general. This is a worthwhile goal for all who seek to provide care for others.

GUIDE 16-1

AMOUNTS OF SUGAR IN COMMON FOODS

Here are the approximate amounts of refined sugar (added sugar, in addition to the sugar naturally present) hidden in popular foods.

FOOD	SIZE	APPROX. SUGAR CONTENT IN TEASPOONS
Beverages		
cola drinks	6 oz.	3½
ginger ale	6 oz.	5
root beer	10 oz.	4½
lemon-lime carbonated	6 oz.	3 3/4
sweet cider	1 cup	6
Dairy Products		
ice cream cone	4	3½
ice cream soda	1	5
ice cream sundae	1	7
malted milk shake	10 oz.	5
Desserts, Misc.		
apple cobbler	½ cup	3
blueberry cobbler	½ cup	3
custard	½ cup	2
fruit gelatin	½ cup	4½
apple pie	slice	7
berry pie	slice	10
cherry pie	slice	10
cream pie	slice	4
lemon pie	slice	7
peach pie	slice	7
pumpkin pie	slice	4
banana pudding	½ cup	2
bread pudding	½ cup	1½
choc. pudding	½ cup	4
date pudding	½ cup	7
rice pudding	½ cup	5
tapioca pudding	½ cup	3
berry tart	1 cup	10
sherbet	½ cup	9

FOOD	SIZE	APPROX. SUGAR CONTENT IN TEASPOONS
Cakes & Cookies		
angel food	4 oz.	7
applesauce cake	4 oz.	5½
cheese cake	4 oz.	2
choc. cake, iced	4 oz.	10
coffee cake	4 oz.	4½
cupcake, iced	1	6
fruit cake	4 oz.	5
pound cake	4 oz.	5
strawberry shortcake	1 serving	4
brownies (unfrosted)	3/4 oz.	3
macaroons	1	6
oatmeal cookies	1	2
sugar cookies	1	1½
chocolate eclair	1	7
cream puff	1	2
donut (glazed)	1	6
Candies		
average choc. milk bar	1½ oz.	2½
chewing gum	1 stick	½
choc. mints	1 piece	2
fudge	1 oz.	4½
gumdrop	1	2
peanut brittle	1 oz.	3½
Canned Fruits & Juices		
apricots	4 halves & 1 T. syrup	3½
fruit juices (sweet)	½ cup	2
peaches	1 halves & 1 T. syrup	3½
fruit salad	½ cup	3½
Jams & Jellies		
apple butter	1 T	1
jelly	1 T	4-6
strawberry jam	1 T	4

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* Compiled by the Dental Hygiene Students at the University of South Dakota, Department of Dental Hygiene.

Cereal	Sugar %
Super Orange Crisp	68
Sugar Smaks	61.3
King Vitaman	58.5
Fruit Pebbles	55.1
Apple Jacks	55.0
Cocoa Pebbles	53.5
Lucky Charm	50.4
Cinnamon Crunch	50.3
Pink Panther	49.2
Honeycomb	48.8
Froot Loops	47.4
Trix	46.6
Cocoa Krispies	45.9
Baron Von Redberry	45.8
Vanilly Crunch	47.7
Boo Berry	45.7
Orange Quangaroos	44.7
Count Chocula	44.2
Frosted Flakes	44.0
Frankenberry	44.0
Kaboom	43.8
Crunch Berries	43.8
Cap'n Crunch	43.3
Cocoa Puffs	43.0
Super Sugar Crisp	40.7
Sir Grapefellow	40.7
Alpha Bits	40.3
Sugar Pops	37.8
Frosted Mini Wheats	33.6
Sugar Sparkled Corn Corn Flakes	32.2
Bran Buds	30.2
Sugar Frosted Flakes	29.0
Super Sugar Chex	24.5
Heartland	23.1
Fortified Oat Flakes	22.2
Granola (with almonds and filberts)	21.4
All Bran	20.0
100% Bran	18.4
Granola	16.6
40% Bran Flakes (Kellogg)	16.2
Brown Sugar-Cinnamon Frosted Mini Wheats	16.0
Team	15.9
40% Bran Flakes (Post)	15.8
Sugar Frosted Corn Flakes	15.6
Granola (with raisins)	14.5
Granola (with dates)	14.5
Life	14.5
BuckWheat	13.6
Heartland (with raisins)	13.5
Raisin Bran (Kellogg)	10.6
Rice Krispies (Kellogg)	10.0
Concentrate	9.9
Raisin Bran (Skinner)	9.6
Crisp Rice	8.8
Rice Chex	8.5
Total	8.1
Corn Flakes (Kellogg)	7.8
Corn Chex	7.5
Crispy Rice	7.3
Corn Flakes (Food Club)	7.0
Grape Nuts	6.6
Peanut Butter Pops	5.2
Corn Flakes (Kroger)	5.1
Wheaties	4.7
Special K	4.4
Corn Total	4.4
Product 19	4.1
Post Toasties	4.1
Alpen	3.8
Puffed Wheat	3.5
Grape Nut Flakes	3.3
Wheat Chex	2.6
Uncle Sam Cereal	2.4
Puffed Rice	2.4
Cheerios	2.2
Shredded Wheat (spoon size)	1.3
Shredded Wheat (large biscuit)	1.0

As reported in "Caveat Emptor", June 1979.

GUIDE 16-2

FOODS WITH HIDDEN AND NOT-SO HIDDEN SUGARS

hard candy
fudge
angel food cake
sweetened cereal
chocolate milk
sherbet
apple pie
fruits canned in heavy syrup
white bread
glazed donut
jelly
ice cream
raisins
honey

FOODS THAT ARE SUGAR FREE AND SAFE

blue cheese
cheddar cheese
Swiss cheese
eggs
walnuts
ham
peanuts
aged cheeses: e.g., Brie, Gouda,
    Monterey Jack, Mozzarella
potato chips
vinegar
salt
non-carbohydrate sweetened chewing gums
    with mannitol, sorbitol, xylitol

GUIDE 16-3

POINTS OF EVALUATION FOR THE MOUTH

HEALTHY MOUTH

Gum tissue is pink or a shade of pink, regular in shape and form around the teeth
Gum tissue is firm and stippled in texture like the skin of an orange
Teeth are white or a shade of white
Teeth are regular in shape and form
Breath is fresh
Smile is attractive
Jaws and teeth are in good functional arrangement

FAMILY PATTERNS THAT MAY PREDISPOSE TO ORAL-DENTAL PROBLEMS

Overprotective attitude toward the developmentally disabled person
Indulgent (often characterized by the use of sweets as bribes)
Poor oral health among other family members
Dentures among family members (may not be a negative)

BEHAVIORAL SIGNS THAT MAY INDICATE ORAL-DENTAL DISEASE

Refusal to eat or drink hot or cold, spicy or fiber-containing food and drink
Recoil with toothbrushing
Signs of increasing chewing difficulty
Reduced facial expression
Quiet and withdrawn attitudes
Lack of smiles
Mumbling

PHYSICAL SYMPTOMS OF DISEASE

Red, inflammed gum tissue
Gum tissue bleeds easily
Blood on toothbrush after brushing
Overgrown, puffy gum tissue
Discolored, broken-down teeth
Stains on the teeth
Food debris and calculus (tarter) around the teeth
Recession of the gum tissue
Mobility of the teeth
Swelling of the gum tissue or face
Pus draining at or below the gum line around the teeth
Bad breath

The Impact of Drugs on Nutrition

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THE IMPACT OF DRUGS ON NUTRITION

Medications are beneficial for developmentally disabled persons who have problems such as seizure disorders, behavioral disorders, chronic infections, or intestinal disorders. Unfortunately, all medications are capable of causing some undesirable effects in addition to those beneficial effects for which the medication has been prescribed. Some of the undesirable effects which might interfere with food intake or interact with nutrients in the body are discussed in this chapter.

It is important to be able to recognize the signs and symptoms of possible drug-nutrient interactions. This chapter will only list the primary interactions. When one suspects an adverse reaction one should contact a physician immediately and not act on his own.

Anticonvulsants

Anticonvulsants, such as phenobarbital, primidone (Mysoline®), diphenylhydantoin (Dilantin®), and valproic acid (Depakene®), may be prescribed for developmentally disabled persons who have seizure disorders. All of these medications can potentially cause nutritional problems of which parents, teachers, and health care providers should be aware.

Vitamin D Deficiency

It has been shown that many anticonvulsants interfere with the action of Vitamin D in the body. If Vitamin D action is decreased, diseases of the bone, such as osteoporosis (loss of calcium in the bone), osteomalacia (softening of the bones), and rickets (resulting in abnormalities in shape and structure of bones) can occur. Because of the softening of the bone, the incidence of fractures is thought to be higher among persons taking anticonvulsants.

Some authorities advise supplementing the diet of children who take anticonvulsants with Vitamin D. The amount of Vitamin D needed to prevent or treat bone disease may vary greatly from one individual to another, depending on the amount of Vitamin D contributed by the diet. Because Vitamin D present in the body increases the absorption of calcium, it is important to also include calcium-rich foods in the diet to prevent a calcium deficiency.

Since high doses of Vitamin D can result in serious toxicity problems, Vitamin D supplements should be given only with the advice of a physician. Individuals receiving anticonvulsant therapy should, however, be encouraged to consume the Recommended Dietary Allowance for Vitamin D. The chief sources of Vitamin D are milk and other products to which Vitamin D has been added during processing.

Since the body is capable of making Vitamin D when exposed to sunlight, individuals on anticonvulsants may have a reduced need for supplementation if they are able to spend an adequate amount of time outdoors. It is for this reason that Vitamin D deficiency secondary to anticonvulsant use may occur more frequently in the institutional setting than among independently living individuals, and may also occur more frequently in northern than southern climates. This consideration, added to the obvious social and psychological benefits of sunshine, makes the planning of outdoor activities an important part of the teacher and parent's role.

Folic Acid

Another nutrition-related problem associated with anticonvulsant use is the deficiency of folic acid, a B-vitamin. Folic acid deficiency is diagnosed when subnormal levels are found in the blood serum. When the deficiency is advanced, a macrocytic anemia (a diminished number of oversized red blood cells) may be present. Folic acid deficiency may also cause adverse effects on the nervous system.

In spite of the recognized consequences of folic acid deficiency, routine supplementation cannot be recommended. For some individuals, folic acid supplementation will reduce the effect of the anticonvulsant and result in increased seizure frequency. It has been therefore suggested to supplement Vitamin B_{12} along with folic acid in order to reduce this increase of seizure activity. At any rate, folic acid should be supplemented only if drug levels and seizure frequency are carefully monitored and upon advice of a physician. The diets of most individuals contain the Recommended Dietary Allowance for folic acid. It is appropriate to plan diets for developmentally disabled persons which supply adequate folic acid. Foods high in folic acid include dark green leafy vegetables, whole grains and legumes.

Gingival Hyperplasia

Gingival hyperplasia (an increase in the size of the gums), is known to occur in many individuals who use anticonvulsants. This cannot be prevented by any type of nutrition intervention, but by intensive mouth care (see Chapter 16). However, the gum tenderness sometimes associated with gingival hyperplasia may discourage the use of acidic foods and raw vegetables which are difficult to chew. This then can lead to a reduced intake of certain nutrients, particularly Vitamin C. Unless alternate sources are provided, one may avoid problems by providing bite size raw or carefully cooked vegetables.

Stimulants

Stimulants may be used as part of the treatment for behavioral disorders associated with hyperactivity and short attention span. These medications may cause anorexia and suppressed growth, and it is, therefore, important that growth be monitored carefully in children receiving them. Some stimulants, such as Cylert®, Desoxyn®, and Ritalin®, are known to have short-term effects such as decreasing the appetite. Anorexia and weight loss is expected to resolve within three to six months when Cylert® is used, and within a few weeks when Desoxyn® is used. Weight loss with Ritalin® use, on the other hand, is more commonly associated with prolonged use. The experimental use of fenfluramine for autism should receive the same attention as the stimulants mentioned above.

In addition to the maintenance of growth and weight records, the anorexic effect of stimulants may be controlled by giving the drug at mealtime. Some physicians supplement the diet with thiamin (Vitamin B_1) which tends to enhance the appetite.

Anti-depressants and Tranquilizers

Anti-depressants have not been shown to have major effects on nutrient levels in the body. As with many medications, there is the potential that the tricyclic anti-depressants, such as imipramine (Tofranil®) and amitriptyline (Amitril®, Elavil®, Endep®) may cause nausea, vomiting, diarrhea, or altered appetite and taste acuity in some individuals. Tricyclic anti-depressants have also been shown to cause thickening of the saliva, or dryness of the mouth. Since saliva has a role in preventing dental caries, attention to dental care is important when this occurs.

Tricyclic anti-depressants, along with some tranquilizers such as the benzodiazepams (Librium®, Tranxene®, Valium®, etc.) and the phenothiazines (Chlorpromazine®, Mellaril®, Thorazine®, etc.), have also been associated with weight gain. Therefore, weight should be monitored and dietary changes may be necessary if the weight gain is undesirable.

Another group of anti-depressants, called monoamine oxidase (MAO) inhibitors, are known to react with tyramine and other amines which are found in food. Amines are normally broken down in the body by the monoamine oxidase, an enzyme. Since MAO inhibitors work by blocking this breakdown, tyramine or other amines present in the food will accumulate and cause symptoms of palpitations (fluttering of the heart), severe headache and potentially life-threatening hypertension. A low tyramine and tryptophan diet should be provided for persons taking MAO inhibitors.

Amines are breakdown products of proteins, and are found chiefly in aged or fermented foods that contain protein. Since the amine content may depend on the length of time a food has been aged, one will find a great deal of variation in the tyramine content found in various food composition studies. Cheese has been the major food reported to cause hypertensive crisis. Other possible sources of tyramine are fermented sausages (salamis, pepperoni, summer sausage), fermented and dried fruits (i.e., figs, raisins, prunes), pickled herring, cultured dairy products (i.e., yogurt, buttermilk, sour cream), chicken and beef liver, broad beans, soy sauce, chocolate, vanilla, yeast extract, monosodium glutamate, licorice, bananas.

Laxatives and Anti-diarrheals

Problems with diarrhea or constipation among developmentally disabled individuals may prompt the frequent use of medications for diarrhea or laxatives for constipation. The use of mineral oil as a laxative may promote deficiencies of the fat soluble vitamins A, D, E, and K, since these vitamins dissolve in the mineral oil and are eliminated in the stool. Laxatives which contain mineral oil include Agarol® and Milkinol®. Other laxatives and antidiarrheals may have the side effects of nausea, vomiting, or abdominal discomfort, as is true with many medications. Long term use of laxatives may also lead to malnutrition due to interference with nutrient absorption.

The parent, teacher, or nutritional care provider may be able to help prevent the need for anti-diarrheals in some cases by insuring that the disabled child receives attention to his personal hygiene and that food is prepared and served under sanitary conditions. Including adequate fluids and fiber in the diet may help prevent problems with constipation.

Antibiotics

Because the developmentally disabled child may also have physical conditions which make infections more common, nutrition related problems with antibiotics must be considered. The parent or nutrition care provider will want to be aware that antibiotic use may cause loose stools or other symptoms of gastrointestinal distress. It is also possible that long term antibiotic use may affect vitamin utilization because of the effect antibiotics have on microorganisms in the intestinal tract. For example, significant amounts of Vitamin K are formed by microorganisms in the intestinal tract. A change in the number or kind of these microorganisms because of antibiotic use may reduce the amount of this vitamin available to the body.

Another known nutrient interaction with an antibiotic is the interaction between tetracyclines (a group of antibiotics) and minerals. Calcium and iron are both known to combine with tetracycline in the gastrointestinal tract leading to reduced absorption of the drug and the minerals. Therefore, tetracycline should not be given with foods high in calcium or iron (e.g., dairy products).

The antibiotic trimethoprim may also be of particular interest when caring for the developmentally disabled. Trimethoprim is used alone and in combination with other drugs in treating urinary tract and ear infections. Trimethoprim has a folic acid-depleting effect and may cause macrocytic anemia, particularly in patients already low in folic acid, because of malnutrition or anticonvulsant therapy. Trimethoprim combinations may also lead to increased levels of phenylalanine in the blood. This may be of particular concern when working with children who have phenylketonuria (PKU).

In conclusion, prescribed medications may cause nutrition related problems in developmentally disabled persons. The most notable are the effects of anticonvulsants on Vitamin D, calcium, and folic acid. Many other medications can exert a more general influence on nutritional status when appetite is affected or nausea and vomiting reduce intake. A summary of some common medications and their possible effect on nutritional status is given in Guide 17-1 (for a booklet describing food/drug interactions in detail see Chapter 18).

GUIDE 17-1

SUMMARY OF SELECTED DRUG-NUTRIENT INTERACTIONS

Drug	Potential nutritionally relevant side effect
Anticonvulsants	
diphenylhydantoin phenobarbital primidone	Vitamin D and folic acid deficiencies
valproic acid	transient nausea and vomiting
Stimulants	
pemoline methamphetamine methylphenidate fenfluamine	anorexia, weight loss reduced growth rate
Antidepressants	
Tricyclic Diazepams Phenothiazines	weight gain, dry mouth
Monoamine Oxidase Inhibitors Tranquilizers	Headache, palpitations, or hypertensive episode in response to tyramine in food
Laxatives	
Mineral Oil	Vitamin A,D,E,K deficiency
Antibiotics	
Tetracycline Trimethoprim	Reduced Vitamin K absorption to changes in intestinal microflora
	reduced calcium and iron absorption
	Folic acid deficiency High serum phenylalanine levels

Resources

18

RESOURCES FOR THE STATE

This chapter is divided into the following sections:

- I. State Agencies
- II. Private, Non-profit Service Agencies
- III. Volunteer Organizations
- IV. Advocacy Agencies
- V. Health Resources
- VI. Miscellaneous
- VII. Informational Material

I. STATE AGENCIES

A. Department of Social Services
Richard F. Kneip Building
700 North Illinois Street
Pierre, SD 57501
Telephone: (605) 773-3165

The various agencies in the Department of Social Services provide financial support, referral services and direct service to developmentally disabled individuals and their families.

1. Office of Developmental Disabilities
Richard F. Kneip Building
700 North Illinois Street
Pierre, SD 57501
Telephone: (605) 773-3438
    a. Pierre Field Office (605) 773-3438
    b. Sioux Falls Field Office (605) 339-6643

2. Office of Mental Health
c/o South Dakota Human Services Center
P.O. Box 76
Yankton, SD 57078
Telephone: (605) 665-3671

3. Office of Adult Services and Aging
Richard F. Kneip Building
700 North Illinois Street
Pierre, SD 57501
Telephone: (605) 773-3656

4. Office of Children, Youth and Family Services
Richard F. Kneip Building
700 North Illinois Street
Pierre, SD 57501
Telephone: (605) 773-3227

5. Medicaid (Title 19)
Medical Services
Richard F. Kneip Building

700 North Illinois Street
Pierre, SD 57501
Telephone: (605) 773-3495

This program administers the Title 19 program.

6. Medicare - (a federally administered program). Individuals having questions or needing assistance on medical benefits may contact the:
Office of Adult Services and Aging
Richard F. Kneip Building
700 North Illinois Street
Pierre, SD 57501
Telephone: (605) 773-3521

7. Food Stamp Assistance and Information
Call 1-975-2222 (SD Tie Line Number--$1.00 phone charge)
or
Economic Assistance Office
Richard F. Kneip Building
700 N. Illinois
Pierre, SD 57501
Telephone: (605) 773-3493

B. Department of Education and Cultural Affairs
Office of the Secretary
Richard F. Kneip Building
700 North Illinois Street
Pierre, SD 57501
Telephone: (605) 773-3678

1. Special Education Services
Richard F. Kneip Building
700 North Illinois Street
Pierre, SD 57501
Telephone: (605) 773-3678

This service provides assistance in development and implementation of special education programs including the Individual Education Plan (IEP), assistance to parents and service providers in resolving conflicts regarding educational placement, and reviews education programs to promote compliance with Federal and State rules for Special Education.

2. Child and Adult Nutrition Services
Richard F. Kneip Building
700 North Illinois Street
Pierre, SD 57501
Telephone: (605) 773-3413

This agency assists schools and other institutions in providing appropriate meals to all students including developmentally disabled students and residents. It also provides resources and training for staff and families regarding feeding techniques and nutrition education materials (including food preparation and independent living skills).

3. School Cooperatives

a. Lincoln-Union Ed. Coop.
301 West Oak Street
Beresford, SD 57004
Telephone: (605) 763-5096

b. East Central M.D. Vocational School
700 Elm Avenue
Brookings, SD 57006
Telephone: (605) 692-9737

c. Southeast Coop. #1
610 Lincoln
Centerville, SD 57014
Telephone: (605) 267-2644

d. Sioux Area Coop.
1216 N. Garfield
Dell Rapids, SD 57022
Telephone: (605) 428-3963

e. Cornbelt Education Coop.
P.O. Box 185
Parker, SD 57053
Telephone: 297-3773

f. South Central Multi-District Coop.
P.O. Box 28
Tyndall, SD 57066
Telephone: (605)

g. Lake Area Multi District
P.O. Box 730
Watertown, SD 57201
Telephone: (605) 886-8365

h. N. E. Educational Services Coop.
P.O. Box 83
Hayti, SD 57241
Telephone: (605) 783-3409

i. NESD Multi-District Vocational Center
302 E. Maple
Sisseton, SD 57262
Telephone: (605) 698-7613

j. Lake Region Vocational Education Center
R.R. 2
Webster, SD 57274
Telephone: (605) 345-4412

k. Lake Area Special Services Coop.
P.O. Box N
Oldham, SD 57349
Telephone: (605) 483-8244

l. Mid-Central Multi-Services Coop.
20 East 4th St.
Platte, SD 57369
Telephone: (605) 337-2636

m. Hub Area Multi-District Vocational Center
640 Ninth Ave., S.W.
Aberdeen, SD 57401
Telephone: (605) 225-0472

n. Aberdeen Area Coop. Services
115 S.E. 4th Avenue
Aberdeen, SD 57401
Telephone: (605) 225-0250

p. Oahe Special Education Coop.
Box 324
Selby, SD 57472
Telephone: (605) 845-3572

q. Three River Special Services Coop.
P.O. Box 109
Murdo, SD 57559
Telephone: (605) 669-2906

r. N.W. Multi-District Educational Coop.
N. Star Route, Box 78.
Lemmon, SD 57638
Telephone: (605) 374-5278

s. Black Hills Special Services Coop.
Box 215, Nemo Route
Deadwood, SD 57732
Telephone: (605) 578-1914

t. Pine Ridge Area Educational Services
Pine Ridge High School
Pine Ridge, SD 57770
Telephone: (605) 867-5541

C. Department of Vocational Rehabilitation
Office of the Secretary
Richard F. Kneip Building
700 North Illinois Street
Pierre, SD 57501
Telephone: (605) 773-3125

This agency serves to monitor services to the developmental disabled. It points out needs from a state level, monitors various services provided to the developmentally disabled and works with other agencies to better services. It is also concerned with vocational rehabilitation/habilitation.

1. Division of Services to the Visually Impaired
   Richard F. Kneip Building
   700 North Illinois Street
   Pierre, SD 57501
   Telephone: (605) 773-4546

   This agency provides services and informational assistance to the visually impaired.

2. Division of Rehabilitation Services
   Richard F. Kneip Building
   700 North Illinois Street
   Pierre, SD 57501
   Telephone: (605) 773-3195

   This agency provides job training, placement and follow-up for developmentally disabled persons seeking jobs.

3. Disability Determination Unit
   405 South Third
   Sioux Falls, SD 57101
   Telephone: (605) 339-6611

   This agency provides medical evaluation of mental and physical disability for developmentally disabled persons.

D. Department of Health
Office of the Secretary
Richard F. Kneip Building
700 North Illinois
Pierre, SD 57501
Telephone: (605) 773-3361

This agency helps identify individuals with developmental disabilities, provides services directly to the individuals and families, provides financial assistance where possible and assists familyies/individuals in finding other sources of assistance.

1. Children's Comprehensive Health Care Services Program
   523 E. Capitol
   Pierre, SD 57501
   Telephone: (605) 773-3737

2. Community Health Nursing Program
   523 E. Capitol
   Pierre, SD 57501
   Telephone: (605) 773-3737

3. Maternal and Child Health Program
523 E. Capitol
Pierre, SD 57501
Telephone: (605) 773-3737

4. Nutrition Services Program
523 E. Capitol
Pierre, SD 57501
Telephone: (605) 773-3737

5 Women, Infant, and Children's (WIC) Supplemental Food Program
Contact Nutrition Services Program listed in (4) above.

6. State Health Department Laboratory
523 E. Capitol
Pierre, SD 57501
Telephone: (605) 773-3368

This agency provides analysis of fluoride levels, and well testing.

E. Board of Regents Office
Kneip Building
700 N. Illinois
Pierre, SD 57501-2284
Telephone: (605) 773-3455

1. School of Medicine
University of South Dakota
414 E. Clark
Vermillion, SD 57069
Telephone: (605) 677-5621

2. Center for the Developmentally Disabled (UAP)
USD School of Medicine
414 E. Clark
Vermillion, SD 57069
Telephone: (605) 677-5311

This agency provides interdisciplinary training, conducts research and disseminates information on developmental disabilities. Services provided include: social work, medicine, genetics, speech, physical therapy, audiology, psychology, and dentistry.

3. Department of Pediatrics and Adolescent Medicine
School of Medicine
University of South Dakota
Sioux Valley Hospital
Sioux Falls, SD 57105
Telephone: (605) 339-7371

This department provides medical services for children, research, information and a listing of pediatricians in South Dakota.

4. South Dakota Cooperative Extension Service
South Dakota State University
Brookings, SD 57007
Telephone: (605) 688-4147

5. School of the Deaf
1800 E. 10 Street
Sioux Falls, SD 57103
Telephone: (605) 339-6700

6. Nutrition and Food Science Department
Box 2575A
South Dakota State University
Brookings, SD 57007
Telephone: (605) 688-5161

7. School for the Visually Handicapped
423 S.E. 17 Avenue
Aberdeen, SD 57401
Telephone: (605) 622-2580

F. Board of Charities and Corrections
Joe Foss Building
Pierre, SD 57501
Telephone: (605) 773-3478

This agency provides residential care for the developmentally disabled individuals who need special services beyond the scope available within the home and community.

1. Custer State Hospital
Route 1, Box 98
Custer, SD 57730
Telephone: (605) 673-2521

2. Redfield State Hospital and School
P.O. Box 410
Redfield, SD 57469
Telephone: (605) 472-2400

3. South Dakota Human Services Center
P.O. Box 76
Yankton, SD 57078
Telephone: (605) 665-3671

G. South Dakota State Library
Section for the Handicapped
800 N. Illinois
Pierre, SD 57501
Telephone: 1-800-592-1841 or (605) 773-3514

The library serves as a resource for professionals, parents, and the general public. One may obtain service directly with this library, or obtain information through another library. Tapes and films are available as well as specific types of information needed.

II. PRIVATE, NONPROFIT SERVICE AGENCIES

A. Lutheran Social Services of South Dakota
Services for Multi-Handicapped
600 West 12th Street
Sioux Falls, SD 57105
Telephone: (605) 336-3347

B. Lutheran Social Services of South Dakota
Services for Multi-Handicapped
1010 Soo San
Rapid City, SD 57701
Telephone: (605) 348-0477

C. Catholic Family Services
3200 West 41st
Sioux Falls, SD 57105
Telephone: (605) 336-3326

D. Catholic Family Services
1005 West 8th
Yankton, SD 57078
Telephone: (605) 665-1056

E. Catholic Social Services
918 5th Street
Rapid City, SD 57701
Telephone: (605) 348-6086

F. Family Services
1728 South Cliff
Sioux Falls, SD 57105
Telephone: (605) 336-1974

G. Crippled Children's Hospital and School
2501 West 26th
Sioux Falls, SD 57105
Telephone: (605) 336-1840

H. Midwest Children's Center
2331 Oak Avenue
Rapid City, SD 57701
Telephone: (605) 348-8500

I. Area Adjustment Training Centers/Community Residential Facilities:

The ultimate aim of these centers/facilities is to provide the developmentally disabled with whatever training is necessary (educational, vocational, behavioral, social) in order that they may progress to their fullest possible potential and become more independent and productive members of society.

1. Aberdeen Adjustment Training Center
   612 Tenth Avenue, S.E.
   Aberdeen, SD 57401
   Telephone: (605) 229-0263

2. ATCO Enterprises, Inc.
   P.O. Box 1030
   Watertown, SD 57201
   Telephone: (605) 886-7610

3. Black Hills Workshop and Training Center, Inc.
   P.O. Box 2104
   Rapid City, SD 57709
   Telephone: (605) 343-4550

4. Brookings Area Adjustment Services
   P.O. Box 482
   Brookings, SD 57006
   Telephone: (605) 692-7852

5. Chamberlain Adjustment Training Center
   P.O. Box 248
   Chamberlain, SD 57325
   Telephone: (605) 734-5542

6. ECCO, Inc.
   P.O. Box 450
   Madison, SD 57042
   Telephone: (605) 256-6628

7. Huron Area Adjustment Training Center
   R.R. 2, Box 146
   Huron, SD 57350
   Telephone: (605) 352-5698

8. LIVE Center, Inc.
   P.O. Box 59
   Lemmon, SD 57638
   Telephone: (605) 374-3742

9. Mitchell Area Adjustment Training Center
   804 North Mentzer
   Mitchell, SD 57301
   Telephone: (605) 996-2032

10. Northern Hills Training Center
    262 32nd Street
    Spearfish, SD 57783
    Telephone: (605) 642-2785

11. OAHE, Inc.
    706 North Euclid
    Pierre, SD 57501
    Telephone: (605) 224-4501

12. Sioux Vocational School
4100 South Western Avenue
Sioux Falls, SD 57105
Telephone: (605) 336-7100

13. South Central Adjustment Training Center
P.O. Box 1694
Winner, SD 57580
Telephone: (605) 842-1708

14. Southeast South Dakota Activity Center
207 Duke Street
Vermillion, SD 57069
Telephone: (605) 624-4419

15. Southern Hills Developmental Services
1730 Minnekahta Avenue
Hot Springs, SD 57747
Telephone: (605) 745-3408

16. Yankton Area Adjustment Training Center
909 West 23rd
Yankton, SD 57078
Telephone: (605) 665-2518

J. Community Habilitation Facilities

These facilities provide evaluation and treatment for acute mental illness; and may offer assistance in long-term planning and placement.

1. Southeast Mental Health Center
2000 South Summit
Sioux Falls, SD 57105
Telephone: (605) 336-0510

2. Northeast Mental Health Center
P.O. Box 550
Aberdeen, SD 57401
Telephone: (605) 225-1010

3. Black Hills Special Services Cooperative
181 Cliff
Deadwood, SD 57732
Telephone: (605) 578-1914

4. Lake Region Mental Health Center
P.O. Box 1030
Watertown, SD 57201
Telephone: (605) 886-5841

5. Lewis & Clark Mental Health Center
1028 Walnut
Yankton, SD 57078
Telephone: (605) 665-4606

6. Dakota Mental Health Center
   910 West Havens
   Mitchell, SD 57301
   Telephone: (605) 996-9686

7. Brookings Area Guidance Center
   217 West 4th
   Brookings, SD 57006
   Telephone: (605) 692-6892

8. Capital Area Counseling Service
   P.O. Box 148
   Pierre, SD 57501
   Telephone: (605) 224-5811

9. Community Counseling Service
   1552 Dakota South
   Huron, SD 57350
   Telephone: (605) 352-8596

10. Professional Consultation Services
    P.O. Box 447
    Lemmon, SD 57638
    Telephone: 374-3862

11. Southern Plains Mental Health Center
    P.O. Box 662
    Winner, SD 57580
    Telephone: (605) 842-1465

12. West River Mental Health Center
    350 Elk St.
    Rapid City, SD 57701
    Telephone: (605) 343-7262

III. VOLUNTEER ORGANIZATIONS

These organizations serve as a fund-raising and support group for single disorders. They offer instructional material, and to a varying degree, support, advice, and assistance.

A. South Dakota Association for Retarded Citizens
   222 West Pleasant
   P.O. Box 502
   Pierre, SD 57501
   Telephone: (605) 224-8211

B. March of Dimes Birth Defect Foundation
   327 Broadway
   Yankton, SD 57078
   Telephone: (605) 665-8084

C. Muscular Dystrophy Association of America Inc.--SD
1015 N. Minnesota
Sioux Falls, SD 57104
Telephone: (605) 339-2728

D. Myasthenia Gravis--SD
1601 Comet Rd.
Sioux Falls, SD 57103
Telephone: (605) 336-0076

E. American Heart Association
Dakota Affiliate
P.O. Box 1287
Jamestown, SD 58401
Telephone: (701) 252-5122

F. South Dakota Lung Association
208 East 13th
Sioux Falls, SD 57102
Telephone: (605) 336-7222

G. National Society for Autistic Children--SD Chapter
Route 2
Redfield, SD 57469
Telephone: (605) 472-1978

H. South Dakota Office of the American Cancer Society
1025 N. Minnesota
Sioux Falls, SD 57104
Telephone: (605) 336-0897

I. American Diabetes Association--SD Affiliate
1200 S. 7th Ave, McGreevy Clinic
Sioux Falls, SD 57105
Telephone: (605) 337-2140

J. Cerebral Palsy
UCP of the Sioux Empire
3600 S. Duluth
Sioux Falls, SD 57105
Telephone: (605) 337-4220

K. Huntington's Disease Foundation of America
Sioux Valley Chapter
P.O. Box 189
Chester, SD 57016

L. Arthritis Foundation - Dakota Chapter
P.O. Box 303
Pierre, SD 57501
Telephone: (605) 223-2868

M. Cystic Fibrosis Foundation
502 8th St. S.
Fargo, ND 58108
Telephone: (701) 235-3946

N. Easter Seal Society for Crippled Children and Adults of SD, Inc.
106 West Capitol
P.O. Box 297
Pierre, SD 57501
Telephone: 1-800-592-1852

O. Prader-Willi Syndrome Association
5515 Malibu Drive
Edina, MN 55436

P. Epilepsy Foundation of Minnesota
672 Transfer Road
St. Paul, MN 55114
Telephone: (612) 646-8675

Q. Spina Bifida Support Group
3400 South Duluth
Sioux Falls, SD 57105
Telephone: (605) 361-1376

R. American Tuberous Sclerosis Association
P.O. Box 44
Rockland, MA 02370
Telephone: 1-800-446-1211

S. National Tuberous Sclerosis Association
P.O. Box 612
Winfield, IL 60190
Telephone: (312) 668-0787

T. Dakota Chapter, National Multiple Sclerosis Society
313 South First St.
Sioux Falls, SD 57102
Telephone: (605) 336-7017

U. Handicapped Citizens of South Dakota
524 E. Waterloo
Rapid City, SD 57701

IV. ADVOCACY AGENCIES

A. South Dakota Advocacy Project, Inc.
221 South Central Avenue
Pierre, SD 57501
Telephone: (605) 224-8294 or 1-800-742-8108

This project provides the following services:

1. Citizen Advocacy Project
   221 South Central Avenue
   Pierre, SD 57501
   Telephone: (605) 224-8294 or 1-800-742-8108

2. Vocational Rehabilitation Program
   221 South Central Avenue
   Pierre, SD 57501
   Telephone: (605) 224-8294 or 1-800--742-8108

3. South Dakota Guardianship Program
   222 West Pleasant
   Pierre, SD 57501
   Telephone: (605) 224-9647

V. HEALTH RESOURCES

A. South Dakota State Medical Association
608 West Avenue North
Sioux Falls, SD 57104
Telephone: (605) 336-1965

This agency provides a listing of all physicians in South Dakota.

B. South Dakota State Dental Association
P.O. Box 1194
Pierre, SD 57501
Telephone: (605) 224-9133

This agency provides a listing of all dentists in South Dakota.

C. South Dakota Hospital Association
305 South Garfield
Suite 5
Sioux Falls, SD 57104
Telephone: (605) 339-9313

D. Health Care Facilities Association
305 South Garfield
Suite 2
Sioux Falls, SD 57104
Telephone: (605) 339-2071

E. South Dakota Dietetic Association
c/o South Dakota State University
Box 2275A
Nutrition and Food Science Department
Brookings, SD 57006
Telephone: (605) 688-5161

F. South Dakota Occupational Therapists Association
c/o Crippled Children's Hospital and School
2501 W. 26th
Sioux Falls, SD 57105

G. South Dakota Physical Therapists Association
3508 S. Glendale
Sioux Falls, SD 57105

H. South Dakota Nutrition Council
c/o South Dakota State University
Box 2275A
Nutrition and Food Science Department
Brookings, SD 57006
Telephone: (605) 688-5161

I. South Dakota Chapter of the American Academy of Pediatrics
c/o Department of Pediatrics
School of Medicine
University of South Dakota
Sioux Valley Hospital
Sioux Falls, SD 57105
Telephone: (605) 339-7371

J. Dairy Council of South Dakota
619 5th Avenue
Brookings, SD 57006
Telephone: (605) 692-4812

VI. MISCELLANEOUS

A. South Dakota Association of Adjustment Services
P.O. Box 311
Pierre, SD 57501
Telephone: (605) 224-6456

B. South Dakota Association for Education of Young Children
222 West Pleasant Drive
P.O. Box 502
Pierre, SD 57501
Telephone: (605) 224-8211

C. Dental Services for the Handicapped

A REFERRAL MANUAL - A listing of South Dakota dentists arranged by county who are presently treating or willing to treat patients with various disabilities. Specific disabilities are identified. Write for your free copy at:

The Department of Dentistry
Redfield State Hospital and School
P.O. Box 410
Redfield, SD 57469

D. SERVICE CLUBS in many areas provide assistance to families and individuals with special needs. Examples of these include Jaycees, Kiwanis, Shriners, Lions, Optimist, Rotary, and Sertoma. Contact the nearest local club.

E. Drooling Surgery

For information on drooling surgery contact: Ontario Crippled Children Center, Toronto, Canada.

F. Head Start Programs

These programs provide medical, dental, and educational evaluation and preschool education for special needs children.

1. South Central Child Development Program
   P.O. Box 6
   Lake Andes, SD 57356
   Telephone: (605) 487-7636

2. Northeast South Dakota Head Start Program
   617 Citizens Building
   Aberdeen, SD 57041
   Telephone: (605) 229-4506

3. Interlakes Head Start Program
   Box 268
   Madison, SD 57042
   Telephone: (605) 256-6518

4. Sioux Falls Head Start Program
   Irving School
   430 West 11th Street
   Sioux Falls, SD 57104
   Telephone: (605) 338-6753

5. Head Start of the Black Hills
   P.O. Box 1572
   Rapid City, SD 57709
   Telephone: (605) 341-6448

6. Oahe Child Development Program
   P.O. Box 907
   Pierre, SD 57501
   Telephone: (605) 224-6361

7. USD Head Start Program
   219 School of Education
   University of South Dakota
   Vermillion, SD 57069
   Telephone: (605) 677-5235

VII. INFORMATIONAL MATERIAL

A. Mealtimes for Severely and Profoundly Handicapped Persons. Perske, Robert Ed., A. Clifton, B.M. McLean, J.I. Stein. Baltimore: University Park Press, 1977. (See section by Larry Coffee, DDS, entitled "Planning Daily Care for Healthy Teeth").

B. Guide to Dental Health. The Journal of the American Dental Association, special issue, 1983.

C. A food and drug interactions booklet is available from:

Food-Medication Interactions
P.O. Box 26464
Tempe, AZ 85282

D. Parent Training Brochure for Inappropriate Mealtime Behaviors

Rex Forehand
Psychology Department
University of Georgia
Athens, GA 30602

E. Sources of Feeding Aids for Developmentally Disabled

1.	Mersco Medical, Inc. 518 5th St. Rapid City, SD 57701	No catalog
2.	Kreiser Surgical, Inc. P.O. Box K 21st & Minn. Ave. Sioux Falls, SD 57101	No catalog
3.	Fred Sammons, Inc. P.O. Box 32 Brookfield, IL 60513-0032	food guards, palm self-handle utensils, scooper plate/bowl, swivel utensils, rocker knife plastic coated utensils, built up utensils, feeding cups, bent utensils
4.	Flaghouse Ind. 18 West 18th St. New York, NY 10011	swivel utensils, built up cutlery, food bumper, scooper plate/bowl, drinking cups, feeding cups
5.	Achievement Products, Inc. P.O. Box 547 Mineola, NY 11501	one handle cup, silicone rubber spoon, self-handle utensils, two handle cup, plastic coated teaspoon, baby beaker, baby easy grip spoon, thermal plate, bent spoon, food guard, catch-all bib, angled spoon, baby scoop, bowl

& scoop dish set, swivel
utensils, built up utensils

6. Mothercare-By-Post
P.O. Box 145
Watford, England
Telephone: Watford (0923) 40366

Mothercare® spoons

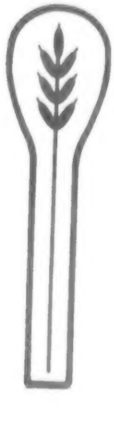
F. Videofluoroscopic Diagnosis of Swallowing Disorders

1. Crippled Children's Hospital and School
2501 West 26th
Sioux Falls, SD 57105
Telephone: (605) 336-1840

2. Rapid City Regional Hospital
353 Fairmont Blvd.
Rapid City, SD 57701
Telephone: (605) 341-1000

G. Follow-up Teaching Program for Feeding and Swallowing Problems

Crippled Children's Hospital and School
Departments of Speech and Occupational Therapy
2501 West 26th
Sioux Falls, SD 57105
Telephone: (605) 336-1840



GLOSSARY OF TERMS

amines--chemical compounds containing amino groups (nitrogen, hydrogen), a basic building block for proteins.

amino acids--the basic building block of proteins.

anorexia--loss of appetite, sometimes associated with dangerous weight loss due to self-starvation (Anorexia nervosa).

anthropometric measurement--height, weight, and body fat measurements

bulimia--abnormally increased appetite, sometimes associated with weight gain as the result of binge-eating and occasionally also followed by self-induced vomiting or the use of laxatives to purge the body.

bulimarexia--characterized by self-starvation followed by cyclical binge-eating completed with self-induced vomiting and the use of laxatives to prevent weight gain.

Calorie (Cal)--international energy unit. One Calorie is the amount of energy (heat) required to raise the temperature of 1000 grams of water one degree centigrade.

carbohydrates--complicated chemical substances containing carbons and hydrogen. The basic building block for carbohydrates is sugars. Complex carbohydrates (fiber) have very little nutritional value but are important for digestion in as much as they provide roughage which stimulates peristalsis.

centimeter (cm)--international measure of length, equal to 0.394 of an inch. One inch is 2.54 cm.

chewing--process used to break up solid food in preparation for swallowing characterized by spreading and rolling movements of the tongue propelling the food between the teeth, tongue lateralization, and rotary jaw movements.

clear liquid--a liquid diet allowing only tea, coffee, coffee substitute, fat-free broth, ginger ale, fruit juices, flavored gelatin and fruit ices. This is a nutritionally inadequate diet. The primary purpose of the diet is to relieve thirst and maintain water and electrolyte balance.

congenital heart disease--a heart condition present at birth.

controlled, mature bite--easy closure of the teeth on the food with an easy release of the food for chewing usually seen about 12 months of age dependent upon development of the teeth.

dental plaque--the accumulation of bacteria from the mouth which forms, with various substances from the saliva, a sticky invisible mass that attaches itself to the surface of the teeth, producing acidic irritants that result in tenderness, swelling, inflamation and bleeding of the gum tissue and cavities (decay) in the teeth.

emesis--vomitus, vomiting.

enzyme--an active compound which affects chemical reactions in living organisms, frequently under the influence of vitamins and minerals.

excessive jaw retraction--the pulling back of the lower jaw so that the molars do not make proper contact during feeding. The tension associated with this type of retraction makes chewing particularly difficult for the child and makes it impossible for him to develop rotary movements in chewing.

fat--a chemical compound made out of glycerine and fatty acids. Has the typical "fatty" properties, and is used as storage for energy. Fatty compounds with slightly different chemical structures are important for the function of the nervous system, especially the brain.

fat soluble--able to dissolve in fat. Fat soluble substances can be stored in body fats and lipids.

febrile illness--any illness associated with or characterized by fever.

fluoroscopic evaluation--roentgenological examination to observe motion of organs. Sometimes these are film or video recorded (videofluoroscopy) permitting replay and frame by frame observation.

fructose--basic sugar unit usually found in fruits.

full liquid--a nutritionally adequate diet consisting of liquids and foods that liquefy at room temperature.

gag reflex--a lowering of the jaw with forward and downward movement of the tongue and pharyngeal constriction upon stimulation of the posterior half of the tongue or phareyngeal area. This reflex is present at birth, reduces in strength at approximately seven months of age, and persists through adulthood.

gastroesophageal reflux--a lax stomach entrance mechanism, permitting stomach content to return into the foodpipe.

gastrostomy--a surgical opening in the abdominal wall leading directly into the stomach.

gavage feeding--feeding by nasogastric or gastric tube directly into the stomach bypassing the mouth and foodpipe.

Giardia l.--a parasite causing chronic bowel infections.

glucose--basic sugar unit. Form of sugar used by the body for energy; in carbohydrate digestion, glucose is the final unit used for energy in the body.

gram (gm.)--international weight unit. One gram is about 1/30 of an ounce. A pound has 654 grams, 1000 grams are 1 kilogram (kg).

Heimlich maneuver--a procedure to compress the chest and therefore, increase the pressure inside the chest in order to expell foreign bodies (e.g., food) from the windpipe.

hydantoin--Dilantin®

hyperplasia--an increase in the number of normal cells resulting in abnormal arrangement of tissue as in gingival hyperplasia where there is a gross enlargement in the gingival tissue.

hypoplasia--underdevelopment of a structure or tissue.

jaw clenching--the tight involuntary closure of the jaw makes opening of the mouth difficult. It is important to determine that the clenching is involuntary and is not just the child's behavioral manner of refusing food.

jaw stabilizaton--little noticeable up and down movements of the jaw in cupdrinking since the tongue and lips are used to draw in liquids; obtained by biting down on the cup rim by approximately 18 months of age.

jaw thrust--abnormally strong downward extension of the lower jaw with greater force and tension than is seen in the full jaw opening observed during suckling in the young infant. The jaw is often stuck in the open position.

kilocalorie (kcal)--1000 calories. This is equal to one Calorie.

kilogram (kg)--international weight unit equal to 2.2 pounds. One pound is 0.454 kg.

lip pursing--tight purse-string movement of the lips in which lip puckering with retraction at the corners is observed.

lip retraction--the pulling back of the lips so that they form a tight line across the mouth.

malocclusion--malpositioning of the teeth which interferes with proper tooth-jaw relationship and function.

MCT--Medium Chain Triglycerides, a special group of fats.

megavitamin therapy--An attempt to treat a variety of disorders, including improper functioning of the nervous system, with large doses of vitamins. The American Psychiatric Association Task Force concluded that there "is no evidence of benefits and some potential for harm in the treatment of common mental illness with vitamin doses of several hundred times the RDA."

munching--up and down motion of the jaw combined with spreading, flattening and some elevation of the tongue to the hard palate which begins at about five months of age.

nasogastric--from the nose to the stomach (as in tubes used for special feeding).

negativistic--behavior peculiarity marked by not performing in a suggested way of action (passive negativism) or in doing the opposite (active negativism).

nonambulatory-inability to walk.

oral hygiene--regular procedures to keep the oral cavity and teeth clean.

parenteral--bypassing the digestive tract, usually medication or feeding through the vein.

paresis--light or incomplete paralysis.

peristalsis - movement of food through the digestive tract.

phasic bite release pattern--a rhythmical series of small jaw openings and closings upon stimulation of the teeth or gums seen in the normal infant until approximately five to six months of age.

pica--appetite, or craving, and ingestion of substances not classified as food (having no nutritive value).

protein--chemical substance of which meat (muscle and other meaty body structures) is made of. The main characteristic is that it contains nitrogen besides carbon and hydrogen. Composed of peptides and amino acids.

qualified nutritionist--a person who has completed an undergraduate program from an accredited college or university, majoring in nutrition. A nutritionist's qualifications are further strengthened by a master's or Ph.D. in nutrition.

Recommended Dietary Allowances (RDA)--Daily recommended nutrient allowances intended to provide adequate nutrition for most normal persons in the United States. The RDA is published by the Food and Nutrition Board of the National Academy of Sciences.

registered dietitian--a person who has completed a baccalaureate degree from an accredited college of university in the dietetic program. Registered dietitians must complete a nationally certified board examination in order to practice.

roentgenological institute--an institute where roentgen (x-ray) examinations and treatments are performed.

rooting reaction--head turning response to tactile stimulation applied to the lips or facial areas surrounding the mouth seen in normal infants. This is retained longer in breast fed children.

rotary jaw movements--used in chewing involving the integration of up and down and lateral movements of the jaw, which increase in the child from 18-36 months of age.

satiety--feeling of fullness after eating.

simple texture progression--progression from pureed food to ground food to chopped food to soft food and finally to solid foods.

sucking--a rhythmical method of obtaining liquid characterized by up and down tongue body movements, tongue-tip elevation, greater lip approximation, minimal jaw excursions, and negative pressure in the oral cavity.

suckling--early lick-type infantile method of sucking characterized by forward and backward tongue movements, large up and down jaw excursions, and loose lip approximations.

sucrose--also referred to as table sugar.

tactile stimuli--stimulation by touch.

time-out--strategy used in a confrontational situation to separate the parties, give them an oppotunity to calm down and start to renegotiate.

tongue lateralization--movement of tongue to the sides of the mouth to propel food between the teeth for chewing.

tongue retraction--the strong pulling back of the tongue in the mouth. The tongue tip is elevated to the hard palate or it is sitting on the floor of the mouth with the back of the tongue elevated.

tongue thrust--abnormally forceful protrusion of the tongue in which the tongue has a thick appearance.

tonic bite reflex--abnormally strong closure of the jaw upon stimulation of the teeth or gums. Attempts to remove a spoon caught in a tonic bite result only in stronger closure of the jaw.

ultrasound--soundwaves beyond the audible sound. When visualized, body structures are seen similar to an x-ray examination, but without radiation exposure.

water soluble--able to dissolve in water. Water soluble substances, as a rule, cannot be stored in the body and are excreted in the urine.

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